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Martin Dewey, D.D.S., M.D., New York
Editor-in-Chief

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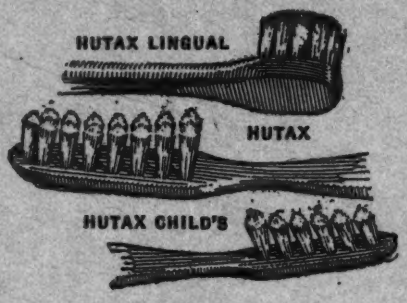

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President of the American Society of Orthodontists, 1921

The International Journal of
Orthodontia and Oral Surgery

VOL. VII ST. LOUIS, MAY, 1921 NO. 5

ORIGINAL ARTICLES

THE POSITION OF THE DECIDUOUS TEETH, AN IMPORTANT DIAGNOSTIC SYMPTOM

BY E. A. BOGUE, M.D., NEW YORK, N. Y.

TODAY is the period of preventive medicine. Why should we not drop the consideration of the teeth as teeth, and look upon them as indications of conditions that exist in the animal economy and that need corrections? Conditions which, if not corrected, will lead to faulty development of the whole body, including faulty development of the permanent teeth, often including flattened sides of premolars and molars, defective enamel covering, which includes deep sulci instead of a continuous enamel surface like a coat of mail over the entire surface of the tooth or teeth affected, and a retardation of their eruption, because the arches into which they must erupt are not big enough for them to come into regularly, and they have to crowd in among a lot of teeth, themselves crowding for space that they have not.

The deciduous teeth show most clearly to him who is able to read their language the conditions that tend to this faulty development of the child, and if not corrected, lead to a body so much below par that the child is not able to fight the battles of life as it should.

The width of the normal maxillary arch of the permanent teeth in the premolar region is generally from 33 to 35 mm. in mankind. The premolars develop between and are embraced by the three roots of the maxillary deciduous molars and they erupt from the same spot, so that if the maxillary deciduous molars stand in the places that the premolars ought to occupy, these premolars will erupt exactly under them and will develop their roots there; but, if these deciduous molars are not in correct position, the premolars cannot be in correct position either, for they develop between the roots of the deciduous molars and they erupt at that spot when the deciduous molars are lost.

Now, the bearing of all this upon our subject is that if the child is in

good health, the deposition of bone (alveoli) around, among, and especially between, the deciduous teeth is such as to form an arch large enough to hold these deciduous teeth steadily in juxtaposition to each other, but not in contact, and the six anterior teeth will be far enough apart for the permanent teeth which are behind and within the circle of their roots to erupt regularly in a proper arch and the vital energy of that child will be such as to cause the deposition of bone between and around the roots of these erupting and developing permanent teeth, so as to hold them securely in the arches. This is normality.

Now let us turn to abnormality. In very many cases, probably the most of them, in civilized life, the dental arches are too narrow; they do not come up to the average as obtained from the measurements of the most ideal dentitions that we can find. This is true of both the deciduous and permanent

Fig. 1.

arches. In so much, then, as the permanent row of teeth with but few exceptions, occupies exactly the same arch that is occupied by the deciduous row, if the deciduous arch is too narrow, spread it as soon as it is found to be too narrow, whether the age of the child is three or six or anywhere in between, but always the sooner the better; because the premolar region is the part of the arch that is nearest the nasal passages, which are also spread when the teeth are spread and is the part that most surely needs spreading in the majority of cases. If the deciduous teeth are still in the mouth, the roots begin to absorb about six years of age, and if the absorption has been great enough to prevent the movement of the premolar crowns in their entirety, these second teeth will either be left in their original positions, or they will be tipped or rotated instead of being moved bodily, and will require readjustment after the deciduous arch is spread. These deciduous teeth can be regarded as handles with which one can widen the nasal cavities and air passages so the child can breath naturally, and with the closure of the mouth

which follows this treatment, the child will be less liable to inhale deleterious germs that may be floating in the atmosphere. As a result of this widening of the arches and nasal cavities, we notice a better development of the thoracic cavity and a more vigorous operation of the heart as well as the lungs.

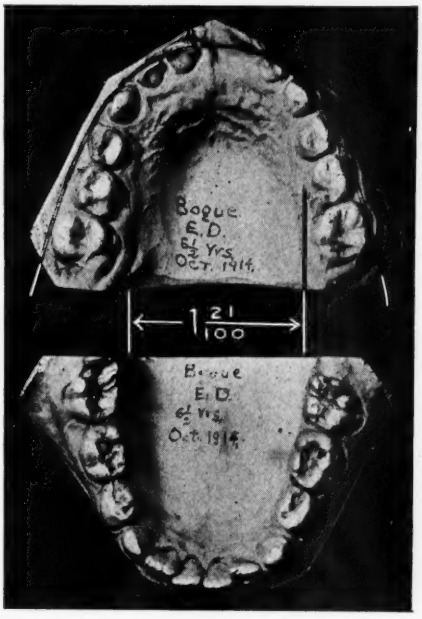


Fig. 2.

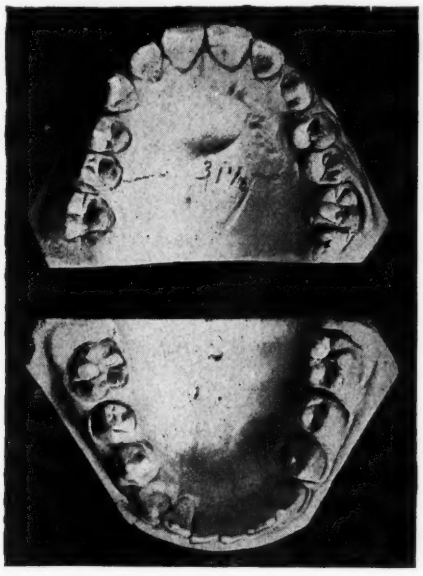


Fig. 3.

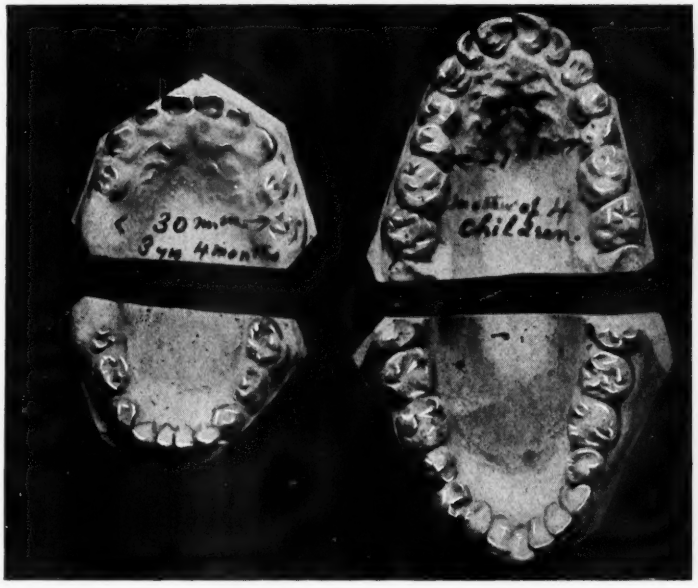


Fig. 4.

There is a periodicity of growth among our civilized children which causes a retardation from about the sixth to the twelfth year when the growth is resumed. In two or perhaps more cases I have apparently succeeded in breaking up this periodicity and the children have continued their growth

uniformly through that period for they are still growing and not yet thirteen years of age.

At the Hygiene Exhibit held in Dresden, I think in 1911, it was shown that the human brain averages at birth 371 grams, and that the brain at six years of age averaged 1360 grams, while at nineteen it weighs 1400 grams. This shows that the skull of the child of six has nearly reached its adult size;

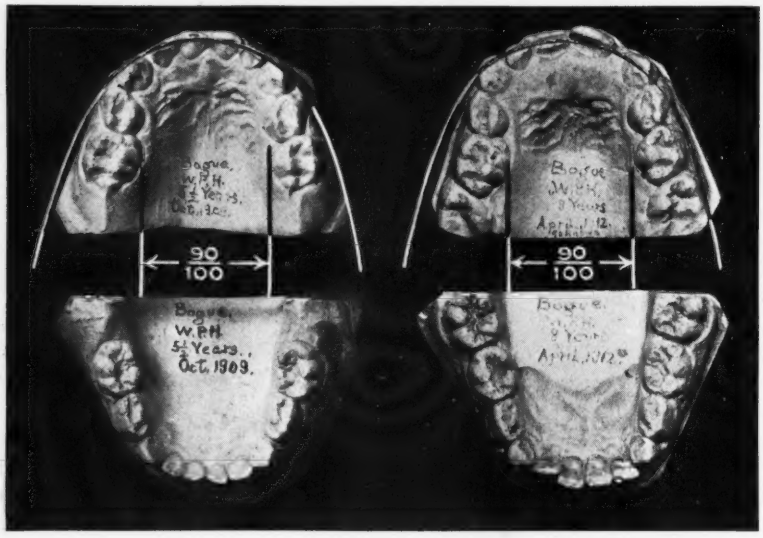


Fig. 5. Fig. 6.

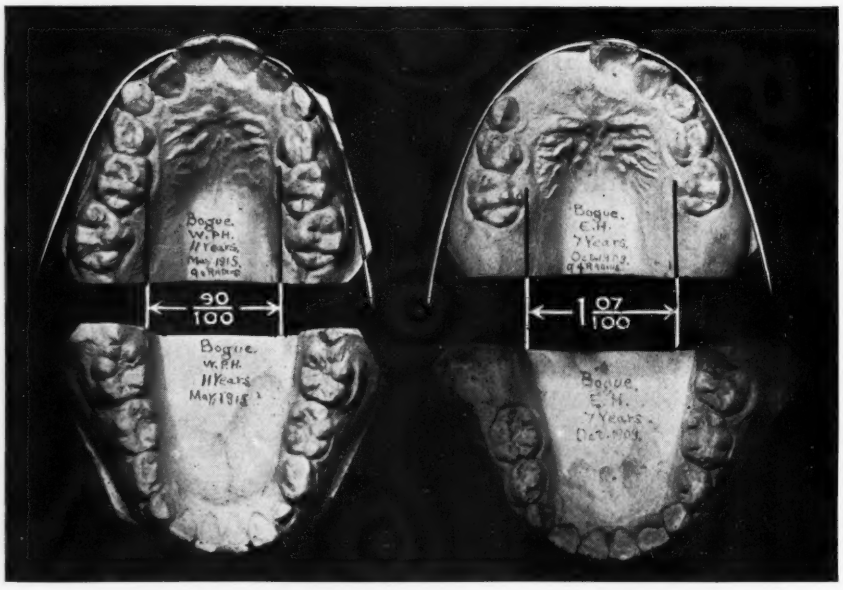


Fig. 7. Fig. 8.

and if the skull can be shown to be subnormal at that age or earlier, the inference would be that it could hardly be expected to become normal at adult age unless something was done to make it resume the growth which had been interrupted. This growth can be stimulated by one of three ways that will be mentioned later.

The early diagnosis of the lack of growth of the skull and face can be made from the deciduous teeth, and made almost at a glance. It has been stated that normality of the deciduous teeth means that the anterior teeth

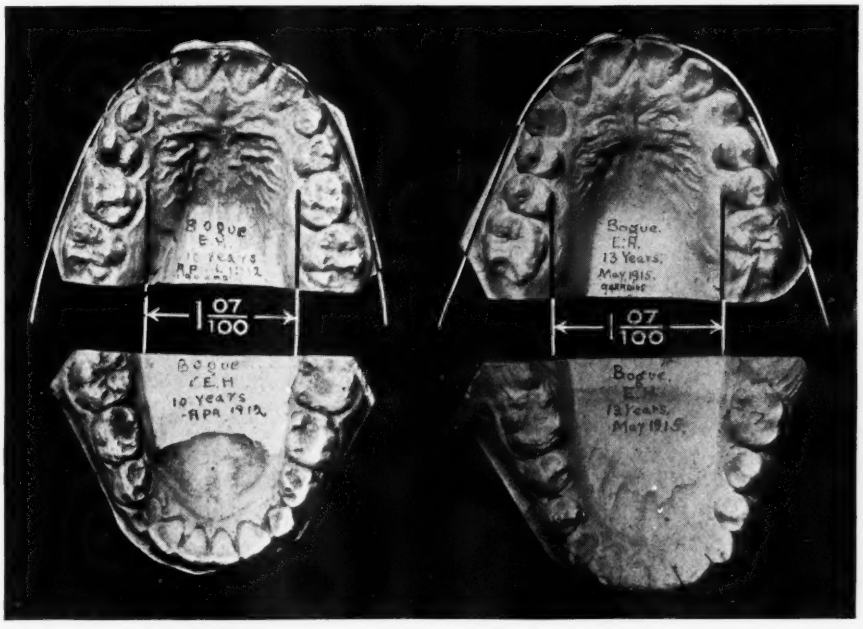


Fig. 9. Fig. 10.

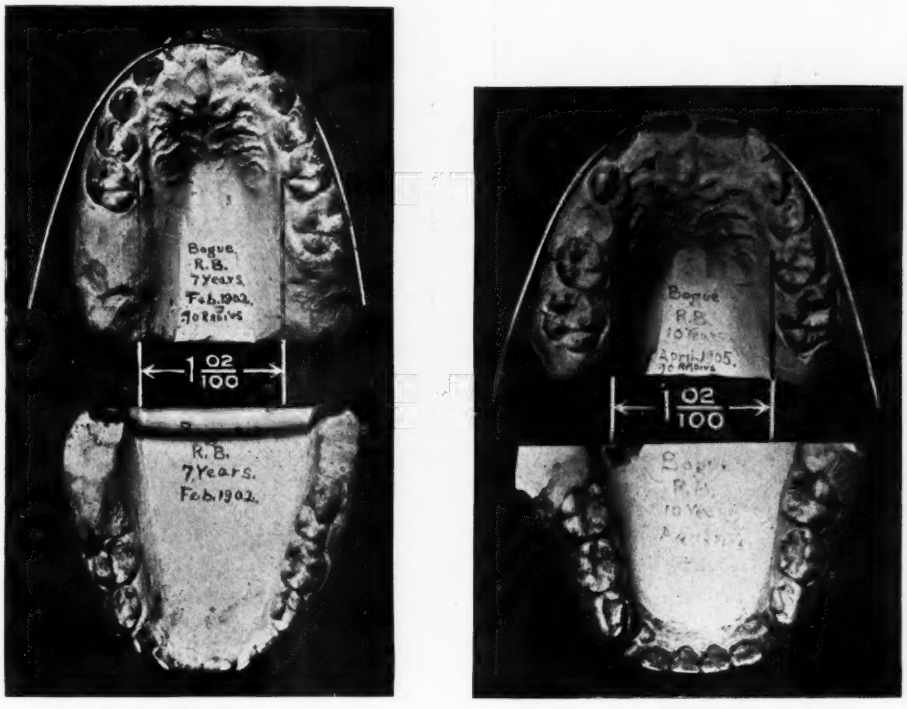


Fig. 11. Fig. 12.

must be separated to insure a normal position of the permanent teeth, and this spacing also denotes normal growth and lack of it indicates abnormality.

Therefore, if the deciduous teeth are found to be close together, the diagnosis is clear that the necessary life force which should accompany development and the eruption of the deciduous teeth has been lacking, and if the breadth between the maxillary deciduous molars is not more than 28 mm., it is fair to presume that some assistance must be given to procure a normal eruption of the teeth, which will in turn mean a normal cranium and face. There are three general ways which may be utilized in causing nature to resume this growth, the lack of which has been diagnosed from the deciduous teeth. First: The use of proper food and exercise. Second: A stimulation of growth by the use of thyroid or other glandular extracts. Third: A stimulation of growth through mechanical means. All of these may be employed at times.

In order to impress more fully what is meant by the normal, I shall show a normal case photographed at two and one-half years of age (Fig. 1). Models

Fig. 13.

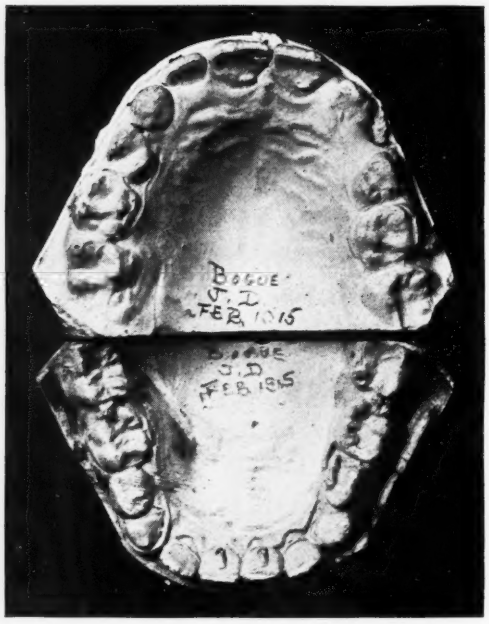


Fig. 14.

of the case were taken at the age of six and one-half (Fig. 2) and the models of the same case are shown at ten years of age (Fig. 3).

As an example of abnormal development or rather lack of development, Fig. 4-*B* shows the models of the mouth of a middle-aged lady who is the mother of four children. She must have had a narrow mouth during childhood, as is shown by the models. The models in (Fig. 4-*A*) are from the mouth of one of her children who has a wider arch than the mother, although the child is but three years and four months old.

Other examples of the lack of development can be shown in the case illustrated by Fig. 5 which was made at five and one-half years. Fig. 6 shows the same case at eight, and there has been no lateral development. At the age of eleven, Fig. 7, we again find no lateral growth has occurred and remains .90 of an inch wide between the deciduous molars.

Another case which also shows similar lack of growth is seen in Fig. 8 which was taken at seven years of age, Fig. 9 at ten years, and Fig. 10 at thirteen. Fig. 11 and 12 also show another case in which there has been no lateral growth over a period of three years. None of these cases shows any lateral growth and the condition could have been diagnosed early and any one or all three of the methods of inducing growth could have been used with good

Fig. 15.

Fig. 16-*A*.

Fig. 16-*B*.

Fig. 16-*C*.

results. Of course mechanical stimulation is the one method that will be most discussed in this paper. With these three cases an early treatment should have been begun.

Fig. 13 shows models of a case at four years of age when treatment was begun. Fig. 14 shows models of the case made three years later. Fig. 15 shows the case again four years after the second model was made. Some idea of the amount of growth that has been obtained can be realized by comparing Fig. 13 with

the models shown in Fig. 15 which are photographed on the same scale. The three views in Fig. 16 show the facial development of the patient at the time the model in Fig. 13 was made. As a result of the growth which was produced by the mechanical assistance, the face has developed as you see it in the three views shown in Fig. 17. The facial outlines in Fig. 17 are associated with the models shown in Fig. 15. The front view of the patient shows a develop-

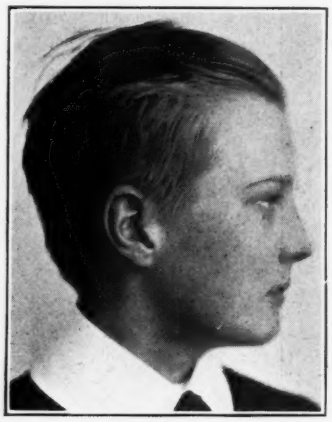


Fig. 17-*A*.

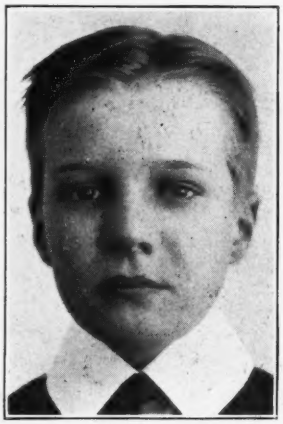


Fig. 17-*B*.

Fig. 17-*C*.

Fig. 18.

Fig. 19.

ment of the face and cranium for which it would be hard to suggest any improvement. In fact the patient would be classed as one of normal growth.

Another case of early diagnosis and treatment is shown in Fig. 18, the models of a patient five and one-half years of age. The arches show a lack of development with no spaces between the deciduous incisors. Within one year the arches were spread as shown in Fig. 19. Fig. 20 shows the case at the age of nine years and two months, and Fig. 21 shows the condition as

found at twelve years and four months. Fig. 22 shows the occlusion of the models. It can be easily understood that the facial outline of the patient was as greatly improved as were the dental arches.

Another case which is slightly different and which was susceptible of an

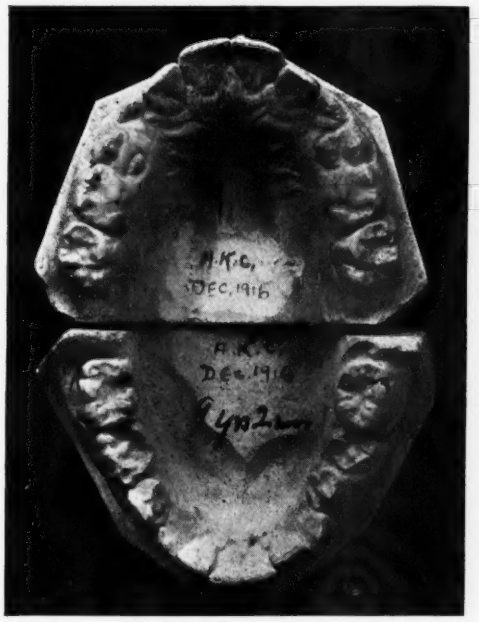


Fig. 20.

Fig. 21.

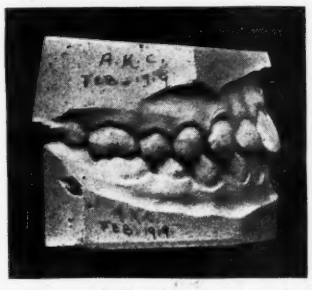


Fig. 22.

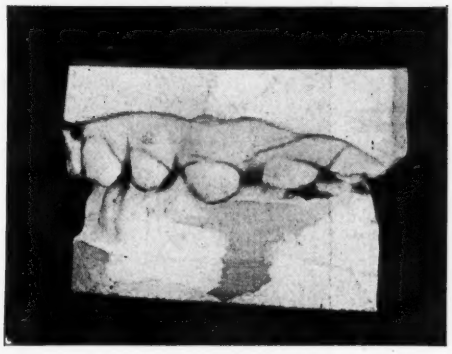


Fig. 23.

Fig. 25.

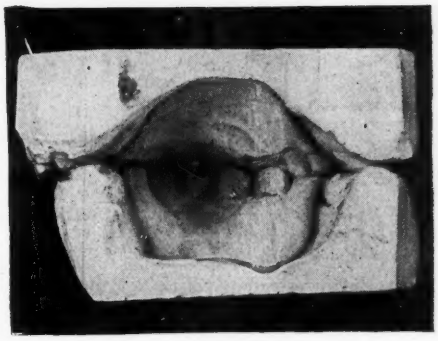


Fig. 24.

early diagnosis is seen in Fig. 23. The models were made when the child was two and a half years old. In January, 1919, the teeth had taken a position whereby the maxillary molars on the left side occluded buccally to the mandibular molars, instead of striking the occlusal surface. As a result of this malocclusion of the teeth, the maxillary molars were forced outward toward the

Fig. 26.

Fig. 27.

cheek, making the maxillary arch 30 mm. broad. The mandibular molars were driven toward the tongue, making a one-sided condition of the mouth. Figs. 24 and 25 show the abnormal relation of the molars. If this case is allowed to remain with the deciduous teeth in malposition, we should expect to find a similar malocclusion of the permanent teeth.

The boy shown in Fig. 26 was five years old and a mouth breather. The maxillary arch was but 28 mm. wide in the second deciduous molar region.

(Left side Fig. 27.) In ten months the maxillary arch was spread until there was 35 mm. between the second maxillary deciduous molars and a corresponding increase in width was obtained in the mandibular arch. This spreading of the molar regions caused a separation of the anterior teeth which I estimated would provide enough space for the permanent teeth. The change in the arches can be seen in Fig. 27, the models on the right being the case after

Fig. 28.

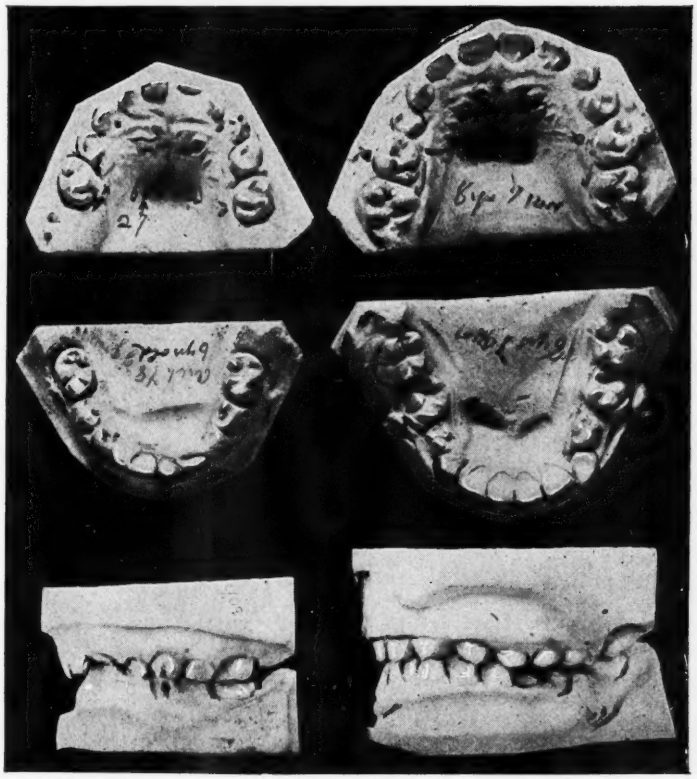


Fig. 29.

expansion. Fig. 28 shows a photograph of the patient a few months after treatment. With the majority of these patients, the breathing is greatly improved by the expansion of the arches and snoring ceases.

The models shown in Fig. 29 represent a boy six years and four months of age whose maxillary arch was only 27 mm. in width. He had suffered from abscesses in his ears in the spring of 1914 and again in the spring of 1916, the ear drums being pierced at both times. Considerable deafness was present at the time of the beginning of the orthodontic treatment. An appliance was

Fig. 30.

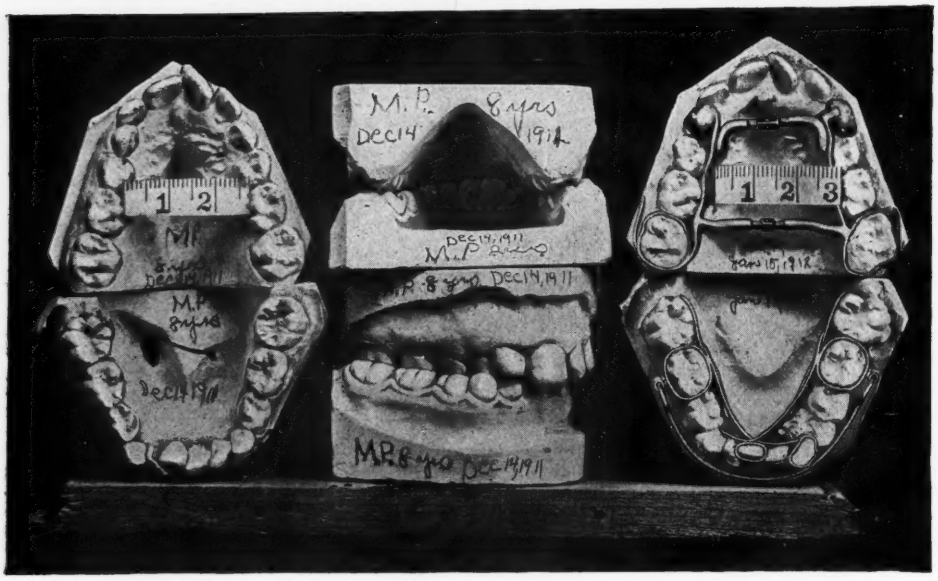


Fig. 31.

placed on the teeth in May, 1916, for the purpose of spreading the arches. In six months the maxillary arches had been widened to 35 mm. between the second deciduous molars. This widening changed the nasal cavities and relieved the pressure on the eustachian tubes, with the result that the deafness was no longer apparent and the boy could hear the ticking of a watch five feet away with both ears. The improvement in hearing has continued up to the present time. One advantage of this early diagnosis and treatment is that by beginning the widening of the arches at five years of age, it is not necessary to attach appliances to the permanent teeth and thereby the danger of decay to the permanent teeth is wholly eliminated. Furthermore, children

who have been taught to keep the teeth clean when they are young acquire habits of cleanliness that remain through life. I have never carried through a case of correction of the deciduous teeth that was followed by decay of the permanent teeth, caused by the regulating appliance. As a rule, too rapid treatment is to be condemned but in the case reported here, I believe the rapid treatment did no harm and the later history of the case shows that the patient was greatly benefited. Figure 30 shows the portrait of a girl eight years of age. We had but twenty-four days before she was obliged to go south for

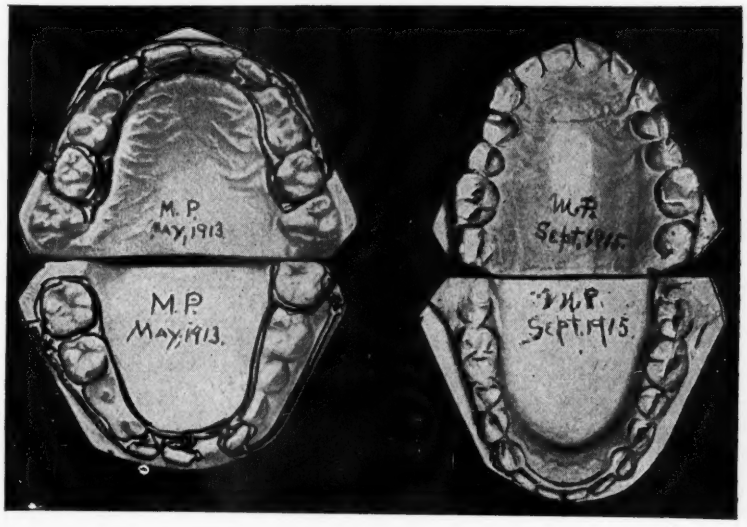


Fig. 32.

Fig. 33.

the winter. A gland had been removed from the neck and there had been one or two operations on the nasopharynx, and the general condition of things indicated that the patient would be greatly benefited by orthodontic treatment to widen the arches. Two screw appliances were used as shown in Fig. 31 and in twenty days we had moved the lateral halves of the arches seven millimeters. Fig. 32 shows later models of the case. The mother has lately sent me a photograph of the child made seven years later than the first one which is Fig. 33. The nasal passages have remained clear, the hearing is normal, and the general health good. Nevertheless, this case could have

been diagnosed much earlier from the position of the deciduous teeth and a normal development started at a much earlier period in life. This case however proves that by widening the arches the breathing can be greatly improved and better hearing established by the proper orthodontic treatment, even though such results are doubted by some.

That the breathing can be greatly improved by the proper orthodontic treatment is proved by the case shown in Fig. 34. The models on the left are of a boy ten years and ten months. The models are shown in occlusion and separated. The rhinologist in attendance decided that it would be impossible

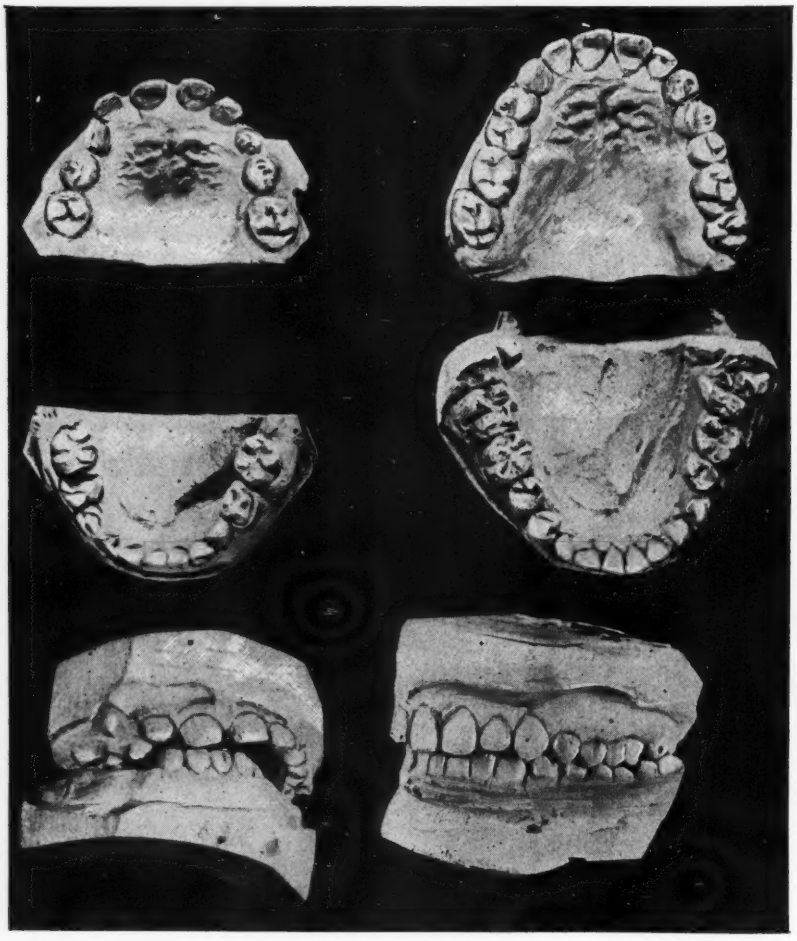


Fig. 34.

to move the teeth at that age and keep them in an upright position. The models on the right show the condition at seventeen years of age, seven years after treatment was begun. Since the orthodontic treatment there has been no further trouble from mouth breathing and the arches have remained in a fair position. This case like the preceding one could have been diagnosed much earlier and better results obtained by an earlier treatment.

It is my belief that most, if not all lack of developments can be diagnosed from the deciduous arches and that great benefit can be derived from early treatment. Of this I am sure from the treatment of many cases during the last twenty years.

DIRECT BAND TECHNIC AND INSTRUMENT EMPLOYED

By Philip L. Salzberg, D.D.S., Brooklyn, N. Y.

THE plain or Magill band is a band contoured to the shape of the tooth the ends of which are soldered together. For its final adaptation to the tooth surfaces, we rely upon the accuracy of contour, elasticity of the band material, and a minimum amount of cement. It is not only used on the anterior teeth, but also on molars and premolars for anchorage, and has almost entirely replaced the ready made clamp band for that purpose, for it is the least irritating to the soft tissues.

The methods employed in making these bands vary somewhat with each operator, but can be grouped as follows:

The direct method—In which the band is constructed directly upon the tooth.

The indirect method—In which the band is constructed either on a plaster or metal model.

Most operators, however, agree that bands for the anterior teeth fit better, and can be made more expeditiously by the direct method. The reason

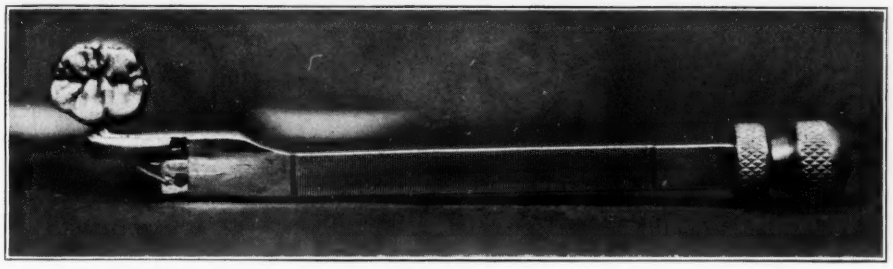


Fig. 1.

for this is that a proper pinch in the band material can be made with suitable pliers, because a thinner gauge metal can be used, and because the field of operation is not obstructed by cheeks and muscles.

What constitutes a correct pinch in the band material? To make a correct pinch, the band material is pulled tightly around the tooth, using a pushing force with the beaks of the pliers, and at the same time closing these beaks. These forces must be perfectly balanced to avoid injury to the tooth and surrounding tissue. Controlling these forces is often a difficult matter. To overcome this and also the difficulty of working on posterior teeth the following described instrument and technic was devised. (Fig. 1.)

The instrument consists of two beaks, the opening and closing of which is controlled by a thumbscrew, and a movable rod, working in a square tube, also controlled by a thumbscrew. The ends of the beaks are concave to con-

form to the convexity of the labial or buccal surfaces of the teeth. The movable rod has a slot anteriorly for anchoring the band material.

THE TECHNIC

A strip of band material is passed around the tooth and the approximate length is noted. To this about one and one-eighth inches more are added. The ends are then joined together by making a very small double fold with flat-nosed pliers. It is then flattened and compressed with the same pliers. The folded portion is passed through the beaks and anchored into the slot in the rod. We thus have a ready-made clamp band, inexpensive, easily made, without any soldered parts, and the additional advantage of encircling the tooth completely.

The same general technic employed in fitting the clamp band is used here. At first the thumbscrew which controls the movement of the rod is slightly tightened. This draws the band material against the tooth. It is then loosened and removed from the tooth. A gingival and occlusal constriction is made inward and the band is placed back on the tooth. This time the rod is drawn in further which draws the band material tighter against the tooth. It is then accurately burnished and secondary pinches with pliers are made if necessary. The pulling force of the rod is then sufficiently released to allow for the closing of the beaks. The beaks are then opened, band removed from the tooth and instrument, and soldered.

The advantages of this method are as follows:

Sufficient force to stretch any gauge band material over the bulge of tooth can be obtained.

The forces are perfectly balanced and under complete control of the operator.

Owing to the curvature of the beaks, a gingival and occlusal constriction is formed.

The beaks of this instrument leave a distinct mark on the metal so that either a square joint or lapped joint can be used in soldering the ends together.

The hands of the operator are at all times free to burnish or make any other changes in the band material.

IMPACTED DECIDUOUS TEETH*

By F. M. Casto, M.D., D.D.S., Cleveland, Ohio

THE subject of impacted deciduous teeth is one upon which very little has been written, and therefore has elicited but little discussion.

The cases I have to exhibit today are peculiarly all deep impaction of the maxillary second deciduous molars. Most of you, no doubt, have observed cases in which some of the deciduous teeth, usually the molars, have failed to follow the occlusal plane. Frequently this is due to the absence of the succeeding permanent teeth, or the lack of vertical development in that particular region. Occasionally these teeth become so wedged between the erupted permanent teeth on either side that extrusion is prevented even though there should be a tendency to do so. More than this, deciduous teeth so placed are sometimes intruded or forced up into their sockets by the crowns of the permanent teeth crowding over their occlusal surfaces, until

Fig. 1.

Fig. 2.

Figs. 1 and 2.—These are radiograms of the case before the operation, and, as one will observe, the impacted deciduous molar is shown in close relationship with the second premolar.

they are almost buried in the jaw. These might properly be called impacted teeth but they are not of the class of cases under discussion.

Until a comparatively short time ago I had not seen a deep impacted deciduous tooth, nor had I heard the subject discussed. The first case came under the observation of Drs. Harvey and Stephan. The upper left second premolar had not erupted, and the first permanent molar had tilted forward, partially closing the space. A radiogram was made, which revealed a condition that was difficult of interpretation. However, a diagnosis of an impacted second deciduous molar was finally made, and an operation for its removal advised. It was thought that a distal movement of the first molar would facilitate the removal of the impacted tooth, so this was done. In due time an anesthetic was administered and Dr. Stephan operated. He

*Read before the Alumni Society of the Dewey School of Orthodontia, April 3, 1920.

discovered that the impacted deciduous molar and the second premolar were encysted, and that neither could be removed singly. He broke up the cyst wall, attempted to pry the teeth apart, and discontinued the operation in the hope that the teeth would separate so the deciduous teeth could be removed. After waiting several days another operation was performed, but it was found necessary to remove both teeth, not because they were encysted but on account of the peculiar relative position they occupied.

Figs. 1, 2, 3, 4, 5 illustrate this case, and I am permitted to present it through the courtesy of my friend, Dr. J. F. Stephan.

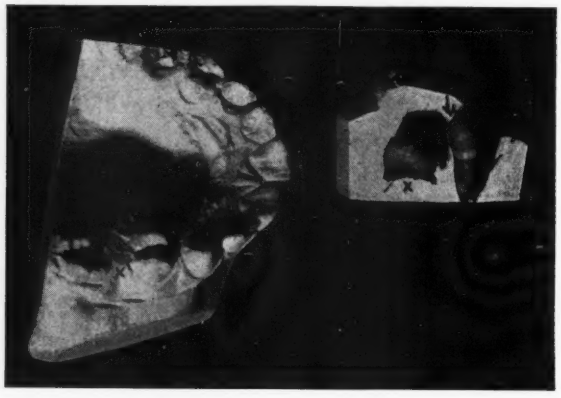


Fig. 3.

Fig. 3.—This is a photograph of the upper cast, and the two teeth removed, viz., the impacted deciduous molar and the second premolar.

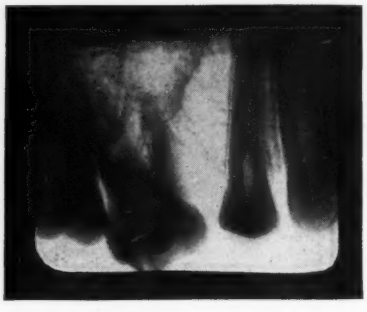


Fig. 4.

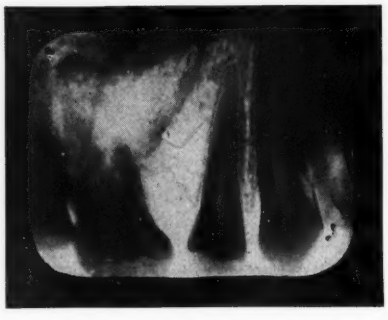


Fig. 5.

Figs. 4 and 5.—These are radiograms of the case three months after the operation and show the regeneration of bone.

Of the five cases I have to present, two were comparatively easy to diagnose, while the other three were quite difficult.

The Diagnosis consists:

First: In taking a history of the case.

Second: Making models and a study of same, observing whether or not there are any missing or unerupted deciduous teeth.

Third: A careful examination of the region suspected both by observation and palpation.

Fourth: Elicit any information regarding local or systemic manifestations or disturbances such as tenderness of the teeth or bone, swelling, or

pain in the affected part, destruction of bone, or resorption of the roots of the permanent teeth, or whether there are any reflex nervous phenomena present.

Fifth: Have good clear radiograms made, and from various angles when necessary. The interpretation of these will form the basis of your diagnosis.

Causation.—The presence of supernumerary teeth, retarded development of the deciduous teeth with an early development, and eruption of the first permanent molar and a mesial movement of same, a misplaced crown, accidents, and constitutional disorders such as rachitis, tuberculosis, and syphilis.

The pathologic significance would be the formation of cysts which might involve one or more teeth, the destruction or dissolution of both the hard and soft tissue, the resorption of the roots of the adjacent teeth, infection, and formation of abscesses, the loss of permanent teeth, and the production of certain reflex nervous phenomena.

Prognosis.—Favorable from a surgical and orthodontic standpoint when the case is treated early, although the loss of permanent teeth may be expected in some cases.

Treatment.—Surgical and orthodontic. The impacted tooth should be removed and the cyst walls destroyed, after which the occlusal relation should be restored.

I shall now give a history and illustrate the cases I have to present.

Case 1.—E. C., male, age eleven years. *History.*—Good. *Diagnosis.*—Impacted upper left second deciduous molar. *Cause.*—Misplaced crown of the deciduous molar and early development and eruption of the first permanent molar. *Pathology.*—Formation of a cyst involving the impacted deciduous tooth and second premolar. The gradual expansion of the cyst walls causing displacement of the roots of the first permanent molar and first premolar, and a dissolution of adjacent bone. *Symptoms.*—Unerupted or missing tooth, slight enlargemet bucco-lingually, malposition of the first permanent molar, negative as to pain, tenderness, or systemic manifestations. *Prognosis.*—Favorable after the removal of the encysted teeth. *Treatment.*—Surgical: Both of the teeth contained within the cyst (second deciduous molar and second premolar) were removed, not because they were encysted, but because their relative positions were such that they could not be separated. Orthodontic interference was not considered necessary, and the present condition of the case bears out the logic of that decision. Figs. 1, 2, 3, 4, and 5 illustrate the case.

Case 2.—J. T., female, age ten years. *History.*—Doubtful. *Diagnosis.*—Impacted upper right second deciduous molar, cyst formation that probably involves the second premolar, which is misplaced and lying almost horizontal in the jaw. *Causation.*—Misplaced crown of the upper right second deciduous molar. Lack of symmetrical or coordinated growth. Probably some constitutional disorder. *Pathology.*—The presence of a cyst, the expanding walls of which are causing pressure with a consequent dissolution of tissue, and producing a more or less continuous nerve strain. *Symptoms.*—Bucco-lingual enlargement, malposition, and tenderness of first permanent molar. Child in high nervous state, bordering on nervous exhaustion. *Prognosis.*—Unfavorable so far as the retention of the first and second premolars are concerned. *Treat-*

ment.—Surgical and orthodontic. This case has not been operated so the extent of a surgical operation cannot be determined. April 3, 1920.

Feb. 1, 1921. Since presenting this case it has been operated upon. A large cyst was found, into which was incorporated the impacted deciduous molar and second premolar. A considerable destruction and dissolution of tissue had

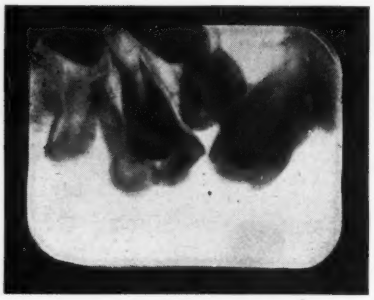


Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 6.—This is the first radiogram made of the case, and presents rather a difficult problem for interpretation, especially when not suspecting an impacted deciduous tooth.

Figs. 7, 8, 9, and 10.—These are radiograms made over a period of about three months, and approximately one year, subsequent to Fig. 6, and at various angles. They show conclusively the impaction of the second deciduous molar.

Figs. 11 and 12.—These are postoperative radiograms, and were taken two weeks and six weeks after, respectively. They show the progressive regeneration of bone.

occurred, and the root of the first premolar was involved to such an extent that its removal was necessary, along with the second premolar and the impacted deciduous tooth. An earlier operation was advised, and might have saved at least one of the premolars, but the parents would not submit to it until it finally became a necessity. Figs. 6, 7, 8, 9, 10, 11, and 12 illustrate this case.

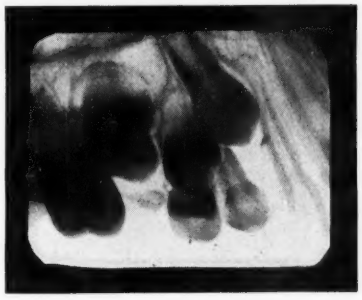


Fig. 13.

Fig. 14.

Fig. 13.—This is a radiogram showing the impacted deciduous molar in such close relationship with the second premolar that it is quite difficult of interpretation. The two small supernumerary teeth are also shown lying horizontally below the impacted teeth, and are undoubtedly the cause of same.

Fig. 14.—This is the same as Fig. 13 except it was taken at a slightly different angle. (A number of radiograms were taken at different angles but these will show all that is necessary here.)

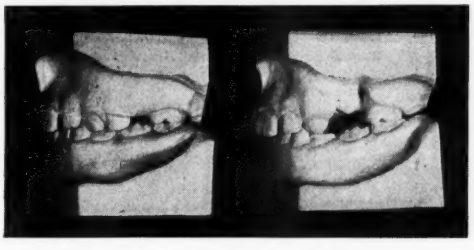


Fig. 15.

Fig. 16.

Fig. 15.—This is a photograph of the models before and after the operation.

Fig. 16.—This is a photograph showing the deciduous molar and supernumerary teeth removed.

Fig. 17.

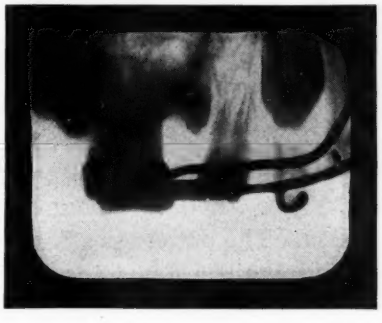


Fig. 18.

Figs. 17 and 18.—These are radiograms taken about six weeks and three months, respectively, after the operation, and show the second premolar in position, and the progressive regeneration of bone.

Case 3.—E. W., female, age nine years. *History.*—Good. *Diagnosis.*—Impacted upper left second deciduous molar. *Causation.*—The presence in the jaw of two supernumerary teeth, which were lying in a horizontal position below the upper left second deciduous molar, preventing its eruption. *Pathology.*—A small

cyst involving the deciduous molar, but not causing any discernible pathological condition at the time of operation. *Symptoms.*—Malrelation of the permanent first molar and a slight bucco-lingual enlargement. *Prognosis.*—Good after the removal of the supernumerary teeth, and the impacted deciduous molar. *Treatment.*—Surgical and orthodontic. The two supernumerary teeth and the impacted deciduous molar were removed and the cyst wall destroyed. The crown of the second premolar was not disturbed as will be observed in the radiogram. The operation was done by Dr. J. P. Henahan, and required about forty-five minutes. The roots of the deciduous molar were well developed and quite divergent to the crown. Figs. 13, 14, 15, 16, 17, 18 illustrate the case.

CASE 4.—S., male, age nineteen years. *History.*—Good. *Diagnosis.*—A

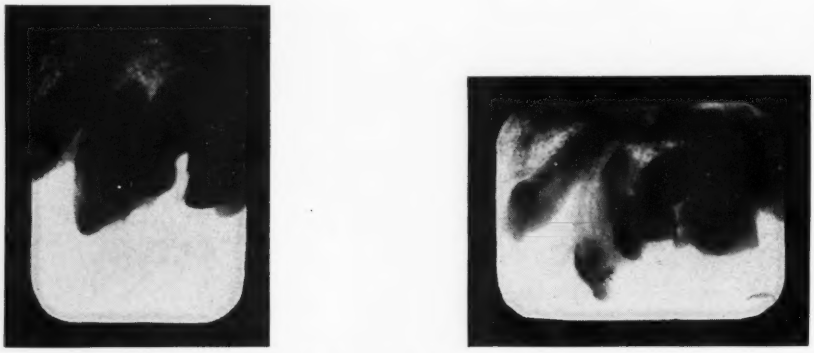


Fig. 19.—These are radiograms, showing the impacted deciduous molar, although rather poorly. Unfortunately, through a misunderstanding, the case was operated before another radiogram was taken.

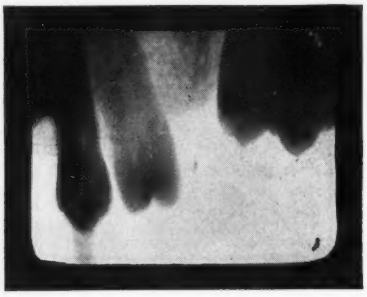


Fig. 20.—This is a postoperative radiogram, made in about six weeks, and shows the condition at that time.

probable impaction of the upper second deciduous molar. The radiograms were not very good and the diagnosis was rather uncertain until confirmed by the operation. The patient is a freshman student at the Dental School. *Causation.*—There is but little doubt in my mind but that this impaction was due to a misplaced crown or tooth. *Pathology.*—The impacted tooth was encysted and the pressure had caused partial resorption of the mesio-buccal root of the first permanent molar, and possibly death of the pulp, also considerable dissolution of adjacent tissues. *Symptoms.*—Malrelation of the first permanent molar and second premolar, bucco-lingual enlargement, tenderness over the affected area. Also of the first permanent molar. *Prognosis.*—Good so far as the health of the tissue is concerned, after the removal of the impacted tooth, and cyst wall. *Treatment.*—Surgical. The first permanent molar was removed on account of its being

pulpless and the evident condition of the bone around the roots. The impacted deciduous tooth was then removed and the cyst wall destroyed. The operation was done by Dr. John Sweeney at the school clinic. The roots had been resorbed and nothing but the crown remained. (Figs. 19 and 20.)

CASE 5.—C. T., female, age eight years. *History.*—Good. *Diagnosis.*—Impacted upper left second deciduous molar. *Causation.*—Misplaced crown of the impacted tooth, and early development and eruption of the first permanent molar. *Pathology.*—A cyst has formed around the impacted tooth that is causing more or less disturbance, the extent of which cannot be determined without an operation. *Symptoms.*—Slight bucco-lingual enlargement. Malposition of the first

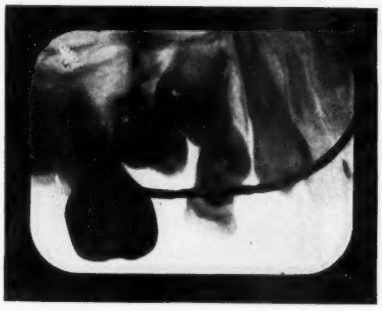


Fig. 21.

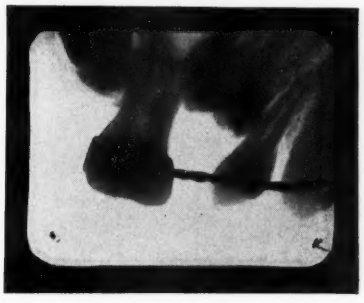


Fig. 22.

Fig. 23.

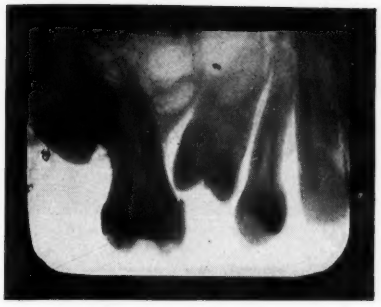


Fig. 24.

Figs. 21, 22, and 23.—These are radiograms showing the impacted deciduous molar and its relation to the second premolar, and roots of the first permanent molar. These were taken at intervals over a period of six months and at different angles.

Fig. 24.—This is a postoperative radiogram made in about four months, and shows the second premolar to be in a favorable position.

molar and slight tenderness. *Prognosis.*—Doubtful as to whether the second premolar can be saved. Otherwise good after the removal of the impacted tooth. *Treatments.*—Surgical. An operation has been advised but on account of the patient being away from the city several months it has not been done, April 3, 1920.

Feb. 1, 1921. Since presenting this case, it has been operated by Dr. Hood. He found the impacted tooth encysted and some destruction of bone, but was fortunately able to remove the tooth without disturbing the second premolar, as indicated in Fig. 21. Figs. 21, 22, 23, 24 illustrate the case.

DISCUSSION

Dr. William C. Fisher, New York City.—I have discussed this particular matter with Dr. Casto before, and I think I have gone over these very cases. I differ with him in one case in which he removed the impaction, and then said orthodontic interference was not necessary because it was shown some time afterward (although it may have moved forward from the position seen in the x-ray) that the molar was tilted. I do not believe he would get proper cusp contact unless he had orthodontic assistance. I am going to show what I consider a failure which was partially caused by what I term progressive impaction, not a full impaction as Dr. Casto had, but one that was progressive. In other words, the infant molar was being pushed further and further back into its socket.

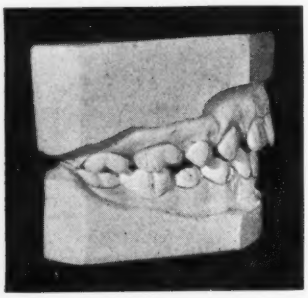


Fig. 1.

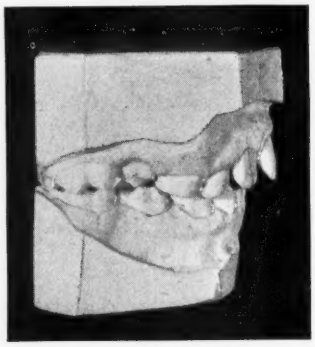


Fig. 2.

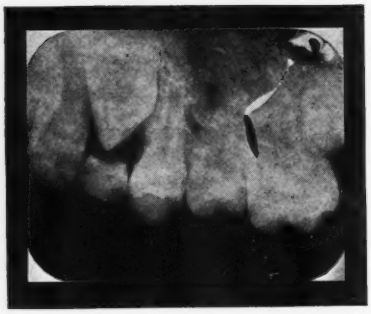


Fig 3.

Fig. 4.

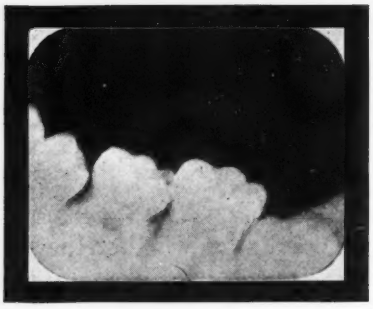


Fig. 5.

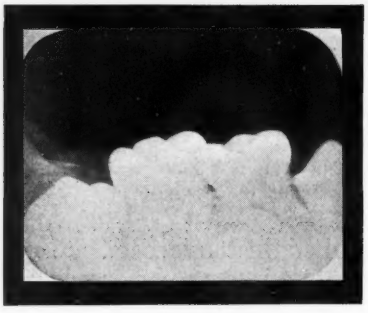


Fig. 6.

Fig. 1 shows the case as I first saw it with the tooth going back into the socket.

Fig. 2 shows the case later. This tooth can hardly be seen. It was progressing so fast that after about six months of orthodontic interference and opening that space, it still seemed to be going into the socket. There was no pressure after I had relieved it six months before, and the x-ray shows (Figs. 3 and 4) that there is no tooth above it. I then took x-ray photographs of all the teeth and found there were two second maxillary premolars missing

and one mandibular premolar. (Figs. 5 and 6). Of course, that immediately complicated my case. I only saw my case with great interruptions about five or six times during the first year; when this complication of the loss or absence of premolars was found (Fig. 7). I then could not make up my mind whether I should extract the infant molars at that particular moment and close the space or not. I could not make up my mind what I should do in the case of the fifth premolar.

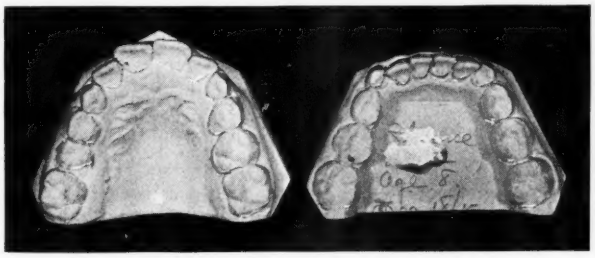


Fig 7.

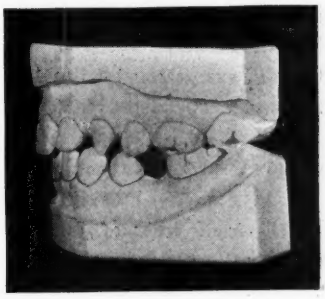


Fig. 8.

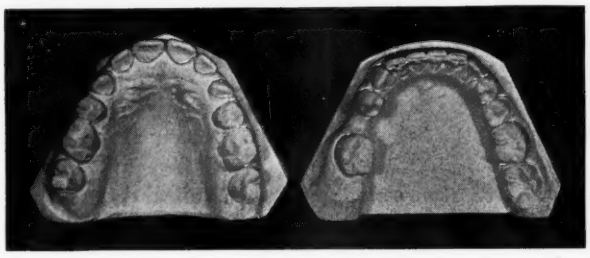


Fig. 9.

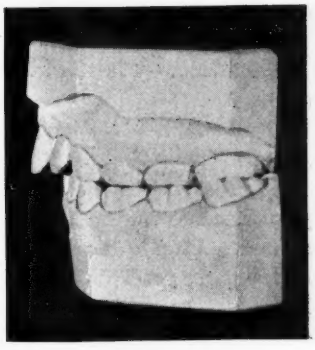


Fig. 10.

Fig. 11.

Fig. 12.

Shortly after that I was called into the army and suspended treatment. I shall show the terrible malocclusion that I found after one year. In other words, I have to start my case after two years and retreat it.

You will notice the tilting (Fig. 8) and the protrusion. The occlusion is very im-

perfect. I must place these molars in the proper occlusal plane and bring them forward (Fig. 9). My argument is that in these cases wherever there is impaction and loss of teeth, we must make a correct diagnosis. I did not make a correct diagnosis because I did not use the x-ray until I had had the case under treatment for nearly twelve months. If I had x-rayed my case the first time, I would have known the teeth were missing: I would have seen the impaction, which was progressing; I would have removed these teeth and closed the spaces and would have finished the case before the Kaiser ever called me away from my work.

Dr. Casto.—Do I understand that the teeth were taken out and the case discontinued?

Dr. Fisher.—I discontinued treatment because of illness of patient for several months after the extraction of these teeth. I was to continue the treatment, but was called to the army and suspended treatment for a year, and that is the result.

Dr. Casto.—Do you think you could have moved the first molars into better positions than you found them between the time you extracted these teeth?

Dr. Fisher.—I think I could have done one thing which is certain; I could have benefited the case, whether I could have completed it or not, I do not know. Here is a photograph of the child taken two months ago. Fortunately I have not destroyed the fine facial lines of that child. (Figs. 11 and 12). When the child was brought to me she had trouble in occluding the jaws; the median line was off about three eights of an inch. Of course, I have corrected that materially and I think you will see the median line there is very good. The first premolars will not occlude in the present condition.

Dr. Casto.—What is the position of the third molars?

Dr. Fisher.—The third molars are coming into place very well. They show no impaction at all.

Dr. Flesher.—In her development from now on, will there be any change in her facial condition?

Dr. Fisher.—If I close the space, the third molars will be given plenty of room. The only question to me is should I have removed in this case the odd premolar? I have five premolars. After discussing the matter with others, I thought it was all right to leave all five premolars, yet I do not think we can have any fixed rule in such cases.

Dr. Guy F. Corley, Mattoon, Illinois.—I would like to ask the essayist whether he thinks these cases are merely coincidences, whether they are supernumerary teeth, and whether he has a solution for them?

Dr. Casto (closing the discussion.)—In answer to Dr. Corley's question, will say that these cases have simply been coincidences. It has so happened that no other deep impacted cases of deciduous teeth have presented. There is no reason why impaction should be confined to these particular teeth.

With regard to the question asked by Dr. Weeks, that was answered in the first part of my paper. I stated that the cases to be presented were deep impactions and not conditions where the deciduous teeth had erupted and afterwards had been intruded into their sockets. I do not believe it possible for a deciduous tooth, after it has taken its position in the arch, to be again forced up into the process and become covered with bone and soft tissue so that it will be completely isolated in the bone. In such cases there will always be a fistula or opening between the tooth so intruded and the oral cavity.

The horizontal position of all of these impacted teeth was about at the upper third of the roots of the first permanent molars.

In regard to the first case presented, I spoke of the inadvisability of orthodontic interference at present. My conclusions were based upon the fact that the first permanent molar is moving forward in a very satisfactory manner, and I believe will continue to do so on account of the pressure constantly exerted by the second and third molars, and there isn't much doubt in my mind but that eventually it will occupy as good an occlusal position as could be accomplished by the use of an appliance.

The cases to which Dr. Fisher referred are those in which the deciduous teeth, after having taken their positions in the arch, have been forced up into their sockets, and thus become impacted, and are not similar in any way to the cases under discussion.

Strange as it may seem, I do not believe that a case of a deep impacted deciduous tooth

has ever been reported or published. The fact that such cases have not been discovered is probably due to the very limited use of the x-ray by the orthodontist. It is quite likely that with the more extensive use of the radiogram, many cases will be disclosed. I hope that many of you present will have the opportunity to report some such cases at the meeting next year.

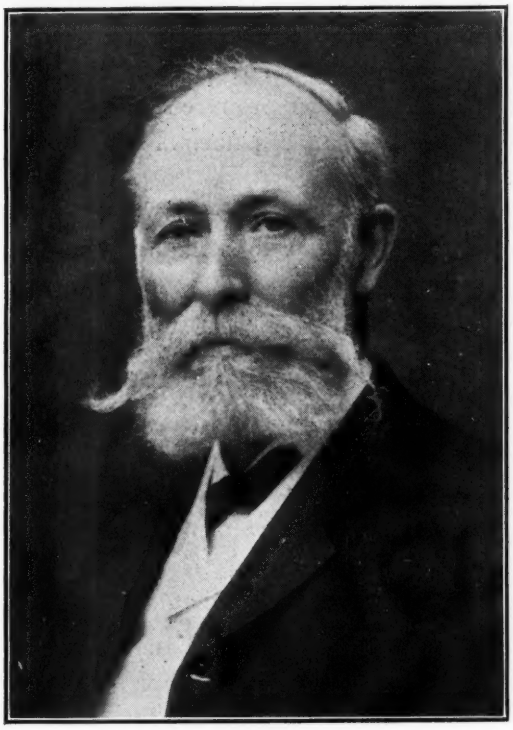
I thank you for your indulgence and the kindly manner in which you have received my paper.

HISTORY OF ORTHODONTIA

(*Continued from vol. vi, p.* 726)

By Bernhard Wolf Weinberger, D.D.S., New York City

EDWARD AUGUSTUS BOGUE, M.D., D.D.S., 1838.—"The correction of irregularities of the temporary teeth for very young children is the most important work of modern dentistry. I hope to show that the best of our constructive dentistry must be done by the time the child is six years old, that such work before the age of six, facilitates the development of the child's whole body



Dr. Edward Augustus Bogue (1838).

as it cannot do at any other age; that it enables Nature to do for the child in the most advantageous manner, much that we have sought to do at a later age, and with great trouble; that such dentistry can be done easily, quickly and practically without pain; that the cooperation of the child and its parents may be

enlisted; and that the results are permanent in a degree which is not always true of the work done at a later age.

"As the years go by I feel more like saying that if the child has competent professional care up to the age of six, he can be almost guaranteed against serious oral troubles during life, and a well developed head, nose and chest, with at least satisfactory physical vigor will result. These are the greatest guarantees of health, intelligence and efficiency that can be given any human being."

Dr. Bogue was among the first to recommend and practice early treatment and correction of the deciduous set of teeth and has for over forty-five years consistently dwelt on this early phase of orthodontic treatment.

In 1889 before the *New York Odontological Society* (*Dental Cosmos,* August, 1889, pages 581 to 596) Dr. Bogue presented his first paper on *"A Study of the Visible Changes that Take Place During the Development of Human Teeth and Their Alveoli."* He states:—"I present for your consideration this evening a study of the visible changes which take place during the development of the permanent human teeth and their alveoli. In saying visible, I refer to those changes that any practitioner may see if he will but take casts of the mouths that come before him and carefully preserve them for a series of years. In giving attention to the changes which take place during this development, my purpose is to find out what Nature has to tell us. Nature is our best teacher. If we can get her mind as to what constitutes a perfect denture and the basis of it, we shall be prepared in any case of imperfection to unite our efforts with hers to produce a normal condition, and that with large prospects of success.

"The diagrams exhibited are intended to illustrate certain well known anatomic facts, so as to open the way to some important and practical inferences.

"The facts are:

"(1) That the jaw continues to grow from infancy to adult age.

"(2) That its elongation is mostly from the second temporary molar backward.

"(3) That its elongation depends largely upon the growth of the permanent teeth.

"(4) That the growth of the alveolus is also dependent on that of the permanent teeth.

"From these facts it will be inferred that the removal of permanent teeth will prevent the natural development of the jaw, the growth of the alveolus, and the attainment of the height of the normal bite. These inferences, I think, will be sustained by the diagrams.

"From these various facts it seems evident that the extraction of teeth during the period of their development results in preventing the normal enlargement, causing irregularity among the teeth, and shortening the bite of the jaws, diminishing thereby the height of the features, impairing their strength, and injuring their contour."

Before the *Pan-American Medical Congress, Bogue* discussed the *Principles*

Underlying the Regulation on the Human Teeth (*Dental Cosmos,* 1893, page 1222).

"In the great majority of cases, irregularities in the position of the teeth arise from the dental arch being too small. The causes which produce this diminution of size are often obscure. We say heredity; we see the roots of pulpless deciduous teeth remaining too long in their places, and deflecting the crowns of permanent teeth away from their proper positions. This deflection is generally, though not always, inward toward the center of the mouth.

"We guess that the failure to masticate properly may in some way, as yet unknown to us, produce these results, as we see them most frequently in those classes where the food is carefully prepared by cooking and made fine for eating.

"But be the causes what they may, the effects are certainly present, and the problem before us is so to correct irregularities in the position of the teeth as to produce the nearest approach to the normal arch, which will through its own perfection remain where it is put.

"It is only through obedience to the laws governing the growth and development of the child that we can hope to obtain permanence in our results.

"Allow me, in closing, to recapitulate these six laws.

"1st. The child continues to grow up to eighteen years of age, or the time for the development of the third molars.

"2d. The crowns of permanent teeth are as large in circumference at six years of age as they ever will be, and they are packed away in their alveoli with regular irregularity, the central incisors lying in front of the laterals and the cuspids almost over them.

"3d. The cuspids are the firmest and least movable of all the teeth in the mouth, so that all the other teeth incline toward them.

"4th. The lower molars incline inward, the upper molars outward.

"5th. Each class of lower teeth develops before the corresponding upper teeth, and thus guides, or ought to guide, the upper teeth into a right position.

"6th. The lower incisors normally lean forward to form an arch with the cuspids, and so support the arch of upper incisors, which, closing outside of the lower ones, are constantly drawn toward them by the action of the lips."

In the *Dental Cosmos,* page 1213 to 1239, December, 1899, we find a paper read by *Bogue* before the *National Dental Association,* on *Results that Follow the Extraction of Permanent Teeth."*

"For the sake of clearness I will give in the first place a list, probably not complete, of the results that follow extraction, and then will explain those results one after the other, lest there should be some to whom occasionally they might not be familiar.

"First, then, it diminishes the size of the dental arches.

"Second, it straightens some of the lines in those arches so that the arch in certain directions is scarcely perceptible. This straightening becomes very evident at times when one has tried ineffectually to place a rubber-dam in one of these straightened arches where the teeth lean forward.

"Third, it diminishes the size of the arch of the palate.

"Fourth, it shortens the bite. That is, it causes the nose and chin to approximate more than would be normal had there been no extraction.

"Fifth, it often causes separation of the upper incisor teeth.

"Sixth, it causes exposure of the gums wherever the triturating or cutting ends of the teeth are not in contact.

"Seventh, it prevents thorough mastication. First, because hard bits of food strike the gum where spaces exist, giving pain or inconvenience; second, because the occluding surfaces of the teeth do not mesh.

"Eighth, it causes undue wearing down of the cusps of the teeth.

"Ninth, it tends later on in life to fractures of the teeth at points of malocclusion.

"Tenth, it gives greater liability to the deposit of tartar.

"Eleventh, it withdraws the normal support of the teeth, each against the other, which originally constituted the arch, resulting in a weakening of the powers of mastication or crushing of hard food.

"Twelfth, it causes as surely undue crowding between the teeth that remain and touch at their grinding edges as it gives space in the places left by extraction.

"Thirteenth, it causes a rotation upon their own axes of the teeth, which lean forward after extraction so that their contact with the adjoining teeth, if contact comes, is awkward, and is conducive to undue deposits both of food and tartar.

"Fourteenth, it diminishes the needed room for the tongue, so that speech frequently becomes less distinct than it would otherwise have been; and sometimes it leaves so little room that the patient complains of being cramped in tongue movement.

"Fifteenth, finally, if the extraction has been early in life the development of the palatine arch is so much interfered with that it becomes impossible to develop first-class vocalization. Patti would never have been heard of had she lost her first permanent molars at the age of eleven or twelve.

"I am sure that if my professional brethren will study the results of extraction as I have been compelled to study them, from the failures that have resulted from extraction, their practices can certainly be made so conservative that they will never extract unless the good to be gained will surely and greatly overbalance the injury that is sure to be done."

Below are enumerated a few of the papers presented by *Bogue*:

Observations on Some Recent Cases of Orthodontia, International Dental Journal, 1902, page 869.

Some of the Causes of Irregular Teeth, with Suggestions as to Preventive Treatment or Early Cure, International Dental Journal, 1903, page 40.

The Principal Molar in Man, and its Relation to and Bearings Upon the Other Teeth, Dental Cosmos, August, 1903, page 605.

The Influence, on Development, of Arranging Irregularly Placed Teeth Into Normal Positions, International Dental Journal, 1905, page 761.

The Relations of the Dental Arches to Pathologic Affections of the Nasopharynx and Adjacent Parts, Dental Digest, 1907, page 1374.

Theories Made Facts, Journal of Allied Dental Society, 1907, page 180.

"During four or five years I have advanced the opinion that the position of the deciduous teeth affects the permanent teeth, and that therefore any irregularities in the deciduous teeth should be corrected in order to prepare the way for the permanent teeth.

"If the deciduous teeth are brought to occupy a normal position, the crowns of the underlying permanent teeth will naturally take a correct position and their roots will be formed in harmony.

"These results have been obtained by means of very simple apparatus. But they are highly instructive to those who are interested in orthodontia."

Appliance for Expanding the Dental Arch, Thereby Increasing the Size of the Nasal Passages and Superjacent Bones, Items of Interest, 1907, page 619. (*American Society of Orthodontists*).

Some Results From Orthodontia on the Deciduous Teeth, Journal of the American Medical Association, 1, 1908, page 267.

Some Reasons for Orthodontia on the Deciduous Teeth, With Description of an Appliance, Journal of the Allied Dental Society.

Prevention of Dental Deformities, British Dental Journal, 1911, page 1121.

Orthodontia of the Deciduous Teeth, eleven papers published in the *Dental Digest* for 1912, continued in the *Dental Digest,* 1918. These papers are also published in two pamphlets, 81 and 28 pages.

In summarizing the articles *Bogue* states:

(1) "The regulation of the temporary teeth is the most important feature in modern Orthodontia.

(2) "The prevention of dental deformities requires the retention of the deciduous teeth in their proper positions, and proper relations to each other until the permanent teeth are ready to erupt.

(3) "Adenoids are a cause of dental, nasal, facial and thoracic deformities.

(4) "Hypertrophied adenoids may be discovered at a very early age by the parents through the presence of snuffles, ear trouble, paroxysmal cough or mouth breathing. The adenoids may generally be removed during the first year of life without an anesthetic, and with very little hemorrhage or pain.

(5) "The early discovery and removal of adenoids and thorough performance of the functions of mastication and breathing are the surest preventives of irregularities among the temporary teeth. We find an intimate relation between the irregular temporary teeth and the whole category of children's diseases.

(6) "Irregularities among temporary teeth are as frequent as among permanent teeth.

(7) "The surest preventive of dental deformities, as well as of the contagious diseases, which are acquired through mouth breathing, is to spread the arches of temporary teeth, when too narrow, and to correct malpositions.

(8) "Underdeveloped dental arches are evidence of lack of vigor. Nature unaided, cannot spread them. Almost all irregularities indicate an arrest in the general development of the child. Protrusion of the front teeth indicates a narrowed arch which is another symptom of arrest in development.

(9) "Spreading the arches of temporary teeth enlarges the nasal passages and allows the mouth to close, thus preventing the entrance directly into the lung of the air-borne microbes of contagious diseases, and forcing them to pass through the filter of the nose.

(10) "The relation existing between the temporary incisors and the permanent ones can, by measuring the width of the upper temporary incisors, be ascertained with sufficient accuracy to furnish a working basis for the calculation of the size of the permanent arches.

(11) "A standard relation between the width of the permanent upper central incisors and the proper width of the dental arches has been demonstrated, so that one may be calculated from the other.

(12) "The correction of dental deformities before the sixth year, not only assures fairly correct arches of permanent teeth, but aids in correction of nasal stenosis, due to deflections of the septum, or to too narrow nasal space and aids in the correction of curvatures of the spine, which carry with them the ribs, an irregular breastbone, and stooping shoulders.

(13) "The child's brain at six years of age is within 40 gms. of its weight at nineteen years of age; hence it is most important that all irregularities of the nose, face or teeth should be corrected before the sixth year while growth is at its maximum.

(14) "Perfectly close and regular teeth after five years of age constitute a marked deformity, and are an absolutely sure indication of a crowded condition in the permanent teeth beneath.

(15) "The normal arch of temporary teeth at five and a half years of age, its front teeth being spread apart normally, should correspond in size to the arch of the ten front teeth of the permanent set at the date of their eruption.

(16) "The conditions which most call for the attention of the orthodontists at this early age (4 to 6 years) are two; prognathism of the lower arch and the continuance too close together of the temporary teeth, especially the six front ones, up to this age. At four years of age these arches can generally be spread at small expenditure of time or money, and without pain if the child has been well brought up and has not been frightened. At five years of age it may take months to accomplish the same result, and at six years of age one can never be sure of results under two years, although the actual movement may have been made in two months. A retainer is necessary in all cases until the temporary teeth fall out.

(17) "Narrow arches of teeth are an indication of lack of vigor. If they are less than 28 mms. broad at lingual gum margins of second temporary molars at five years of age, it is wise to assume that they will not broaden without assistance.

"We of course must take the cases as we find them. Preliminary to any operation, we should determine what has caused the defects that we are undertaking to correct. There may be defects in enamel, defects in structure, shape or contour of the teeth, or defects in their position or relations to each other.

"From 75 per cent to 95 per cent of the dental arches are narrowed by some systemic weakness. This same weakness is indicated by the flattening of

the proximal sides of the bicuspids and molars, thus diminishing the possibility of self-cleansing. The same weakness has prevented a perfect union of the enamel coatings of the teeth.

"The defective spots should be filled before appliances are fitted; if there are approximal cavities, insert fillings and contour them, to make their contact points rounded.

"Regulate misplaced teeth until the lines of occlusion of upper teeth with lower ones are normal, both on grinding and approximal surfaces, and teach proper mastication to insure self-cleansing to a physiologic degree. Teach also what food to eat and what to avoid. Teach deep breathing and correct enunciation.

"While we specialize as orthodontists, let us not fall short in seeing to it, that all can be done, is done, toward putting our patient in good order to enjoy, yes, enjoy good health, for more than three score years and ten, and so justify the confidence that has been reposed in us in placing the patient in our hands.

"Finally, see the end from the beginning. Have a clear idea of the steps to be taken to accomplish that end. I do not mean that no changes should be made as changing circumstances or accidents demand, but that the main course of procedure shall be mapped out beforehand. Let us have a definite reason leading from cause to effect every time.

"Remove the cause," is one of the axioms of the healing art, and orthodontia of the deciduous teeth is treating causes; it is the recognition of conditions causing malposed permanent teeth and underdeveloped jaws; and the correction of those conditions prevents irregularities of permanent teeth with their attendant evils.

"The time and annoyance saved, not to mention the benefit of the health and development of the little patient, whose deciduous teeth were used as the means to procure the space necessary for the permanent teeth, is hard to estimate, but is considerable, as any one interested in the normal development of the child will realize."

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

CASES FROM PRACTICE

By Dr. Arthur Zentler and Dr. Samuel Hemley

Vanderbilt Clinic, Columbia University, New York City

Case I

Miss C. C., age thirty, noticed the growth three or four years ago. It then became larger until it covered the cutting edges of the mandibular central incisors. She went to a dentist who operated and removed the growth, Nov. 19, 1919, without removing any of its base. The growth recurred and grew a great deal faster, this time involving five teeth (Fig. 1).

Fig. 1.—Anterior view of epulis covering the labial surface of the lower incisors.

The tumor, including the four mandibular incisors and the right canine, was removed on April 27, 1920, following the technic described below. The wound was packed with iodoform gauze and was dressed for three subsequent visits at intervals of forty-eight hours. Within about six weeks' time the area was in a receptive condition for a removable prosthetic appliance (Fig. 3).

The following is the pathologic report of this case. "A section of the specimen shows a bit of mucous membrane beneath which the connective tissue is dense and is arranged in irregular bundles. In some places the epithelial pegs extend down between the papillæ for an unusual distance. The cells appear regular and the basement membrane is everywhere intact. The connective tissue is markedly infiltrated with round cells which are gathered together in great cords in the tissue spaces."

Fig. 2.—Lateral view of epulis shown in Fig. 1.

Fig. 3.—Photograph of patient shown in Fig. 1, after operation.

Case II

Miss S. S., age nineteen, noticed the tumor four years ago. She refused to have any teeth extracted and finally found a dentist who removed only the soft tissues, leaving the teeth in position. It recurred and a similar operation was done two years ago. At first it covered only one tooth, the second time it covered two teeth. It recurred again, this time involving three teeth (Fig. 4).

At this stage the patient reported to us and the tumor, including its seat and the three teeth involved, was removed. The wound was packed with iodo-

form gauze for one week, the dressing being changed every forty-eight hours and then nothing but antiseptic mouth washes was used. Within a very short time the wound assumed a normal, healthy appearance (Fig. 5).

The following is the report of the microscopic examination of the specimen taken from the epulis in this case. "A section of the tumor mass shows that its central portion is made up of thick trabeculæ of bone from which there project toward the surface slender trabeculæ of newly formed bone which merge by insensible gradations into the overlying fibrous tissue. The surface of the growth seems denuded of epithelium throughout most of its extent.

Fig. 4.—Epulis involving the two lower centrals and the lower left lateral incisor teeth.

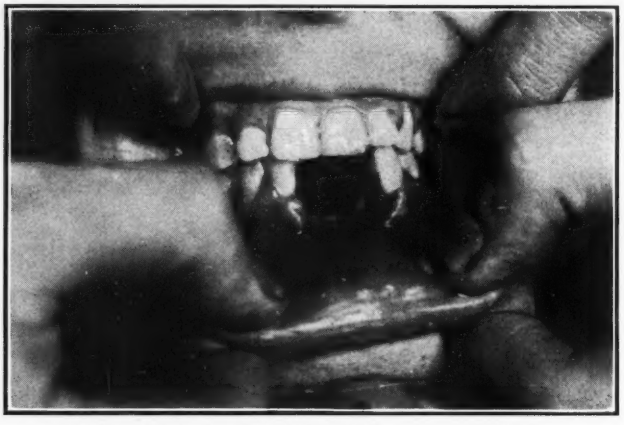


Fig. 5.—Photograph three weeks after operation.

"It is somewhat difficult to judge whether the proliferation of bone and connective tissue is the result of simple chronic inflammation in which case it could be likened to an exostosis or whether it is a true neoplasm, inasmuch as the mass was a pedunculated swelling, it seems more probable that it is a true neoplasm."

It has often been shown by well-known authorities on the subject that certain epulides, after a slow growth for a long time, will suddenly begin to grow rapidly and assume a malignant character; that trauma to a pre-existing epulis which has been almost stationary may cause it to grow rapidly; epulis, which has remained apparently quiescent, may begin to grow rapidly

during pregnancy; recurrences of epulis are likely to occur during pregnancy and grow less rapidly after confinement; that an epulis that has not been completely removed will recur, is usually more extensive and assumes a more malignant character with each recurrence, as can be seen from the histories of Case I and Case II.

From the foregoing facts, it is quite evident that an early and complete removal of the growth is important. The technic described is the one used in the treatment of Case I and Case II and will invariably remove all traces of the epulis and prevent recurrences.

With a Williger knife an incision is made completely encircling the growth and passing well into healthy tissue. The incision should pass through the mucosa, submucosa, and periosteum down to the bone, thus with the one incision cutting off all the blood supply to the tumor and diminishing the possibility of metastasis. When the growth involves both sides of the alveolar process, a similar incision should be made on the lingual or palatal side. With a chisel and mallet, or with a circular saw driven by a surgical engine, the alveolar process is resected; and the entire tumor with its seat is then removed *in toto,* the soft tissues and alveolar process containing the teeth involved. It is very unwise to leave a doubtful tooth and it is good practice to rather sacrifice an additional tooth than to run the risk of a recurrence. Care must be exercised to see that all traces of the peridental membrane in the periapical spaces are removed because epulis has its origin either from the peridental membrane or the alveolar periosteum. It is advisable after the complete removal of the mass to use the actual cautery. The case is then packed several times at intervals of forty-eight hours with iodoform gauze to stimulate granulation. Within a comparatively short time, the wound assumes a healthy appearance. It is necessary to watch the case for a few months before a prosthetic appliance is inserted to be sure that there is no sign of a recurrence.

DEPARTMENT OF
DENTAL AND ORAL RADIOGRAPHY

THE IMPORTANCE OF THE ELECTRIC TEST FOR PULP VITALITY AS AN AID IN DENTAL DIAGNOSIS

BY HOWARD R. RAPER, D.D.S., INDIANAPOLIS, IND.

Formerly Professor of Radiodontia, Materia Medica and Operative Technic, and Junior Dean, Indiana Dental College

THERE is a great difference between simply knowing a thing and knowing it as well as it should be known.

Many years ago we knew that the x-rays were a valuable aid in dental diagnosis, but we did not know it well enough until recently.

We have known for a very long time that dental abscesses cause destruction of bone, but we have not known it well enough until the last few years.

We knew we did not fill pulp canals to the end but we did not know it well enough before the radiograph came into popular used.

Likewise, the dental profession knows now and has known for some time, that the electric test for pulp vitality is a valuable aid in dental diagnosis, but we do not know this well enough as yet.

It is the purpose of the following discourse to help to bring about a fuller and truer appreciation of the importance and value of the electric test for pulp vitality in the practice of dentistry.

In the limited space here available I can report only a few cases, but I want you to realize that in practice there are thousands upon thousands of cases where the use of the electric test is indicated and where the accuracy of the diagnosis depends upon it. Time on end it is absolutely necessary to the correct interpretation of dental radiographs. As a diagnostic measure, it is second in importance only to the radiograph.

Fig. 1. Failure of the lower first bicuspid to respond normally to the electric test directed attention to the tooth. The radiograph shows evidence of a large abscess cavity. There were no local symptoms or signs at all. Had

the electric test not been used a radiograph would not have been made of this tooth and the area of infection would not have been found. On the enamel of the lower first bicuspid the electric test was definitely negative. On the metal of the occlusal filling it was very faintly positive. Normally it would have been positive (+) on enamel and positive very strong (+VS) on the metal filling. Hence I have said that the tooth did not respond *normally* to the test, even though a faint positive was obtained on the simple occlusal filling.

Fig. 2. If one were making a casual examination of the mouth to determine which teeth were "suspicious" and should therefore be radiographed, it is unlikely that the little filling in the upper lateral incisor would arouse suspicion of a dead pulp. But when the electric test is used and the lateral fails to respond, suspicion is aroused. The radiograph shows the lateral incisor abscessed.

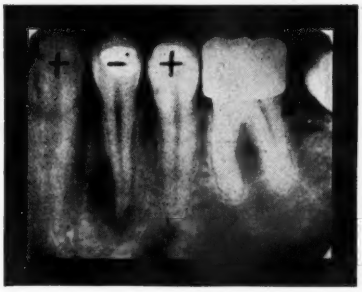


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 3. History of this case when it presented was that "an abscessed lower lateral incisor has been extracted a month previously. Pus still discharging from the socket of the extracted tooth". The electric test was applied to the central incisor and cuspid approximating the socket of the extracted tooth. The central incisor responded positive (+) the cuspid negative (–). Thus a diagnosis was made readily enough, before the radiograph was made. The radiograph verifies the diagnosis, showing the fistulous tract of

the abscess arising at the apex of the cuspid and passing over into the socket of the extracted lateral incisor.

Fig. 4. Three blind abscesses at the apices of the upper incisors. The fact that the pulps were dead in these teeth could have been established by the use of the electric test. The radiograph was necessary to show the amount of bone destruction. The teeth have artificial enamel fillings in them. I am told that the *first* silicious cements placed on the market contained some ingredient which devitalized pulps. I cannot vouch for the truth of this. Absolutely all I know about the matter is this: I have found a sufficient number

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

of dead pulps in teeth, with artificial enamel in them so that I am particularly careful to test such teeth for pulp vitality. More of this material is being used all the time but I do not notice any increase in pulp death in teeth filled with it, which would seem to indicate that the silicious cements now in use do not contain a pulp devitalizing ingredient. (Radiograph by Alger of Los Angeles.)

Figs. 5 and 6. These two radiographs illustrate the necessity of checking up x-ray findings. In Fig. 5 the abscess arising from the lower cuspid seems to involve the adjoining lateral incisor and perhaps the central incisor also. But the electric test for pulp vitality indicates that the pulps in the incisors are vital and therefore not involved in the abscess.

In Fig. 6 the central incisor looks as though it *might* be involved in the abscess of the lateral incisor though its appearance is no more suspicious than the lower incisors, particularly the lateral, in Fig. 5. The fact that the upper central is negative to the electric test while the lower incisors are positive, is what tells us that the upper incisor is abscessed and that the lower incisors are not.

Fig. 7. We have seen the necessity of checking up x-ray findings with the electric test. Now let me illustrate the necessity of checking up pulp test findings with radiographs. The upper cuspid was quite definitely negative to the strongest current. The radiograph shows the reason for it; the pulp has receded away above the gum line throwing up secondary dentin as it

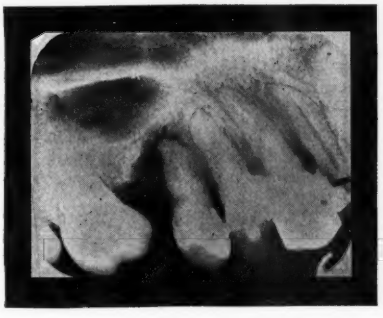


Fig. 8.

Fig. 9.

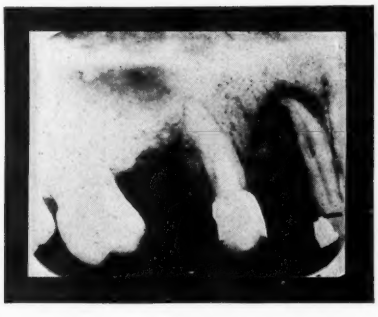


Fig. 10.

withdraws. The pulp is vital but the current could not penetrate the secondary dentin to the pulp.

Figs. 8, 9 and 10. Figs. 8 and 9 were made at the same sitting. They show the apex and periapical tissues of the upper lateral incisor at widely different angles. Neither of them show any bone change which might be taken as evidence of a septic pulp in the lateral. The lateral did not respond to the electric test for pulp vitality though, and the operator, who referred the case, was advised to make a diagnostic opening into the lateral incisor. The operator pinned his faith in the appearance of radiographs and did not make a diagnostic opening.

Fig. 10 was made seven months later. We now see quite definite bone destruction above the apex of the lateral incisor.

Figs. 11, 12, and 13. These three illustrations have been made experimentally from a skull. Fig. 11 does not show the apical bone destruction, while Figs. 12 and 13, made at different angles, do. Suppose we should have a radiograph of a tooth like the second bicuspid in Fig. 11. There would be nothing in such a radiograph to warn us sufficiently of the necessity of making the radiograph over at different angles, *unless* we had records of the application of the electric test.

Fig. 14. The small radiolucent spot at the apex of the root of the second bicuspid might be looked upon as evidence of infection if it were not for the fact that this tooth has a vital pulp, which fact has been established by its very definitely positive (+s) response to the electric test for pulp vitality.

Fig. 11.

Fig. 12.

Fig. 13.

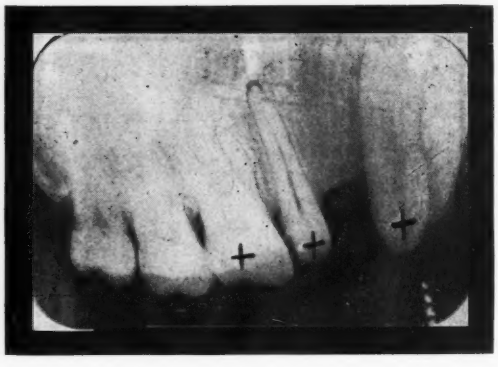


Fig. 14.

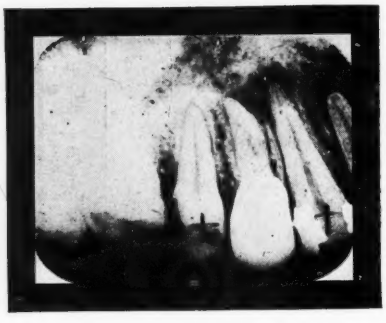


Fig. 15.

A gold shell crown has been removed to test this tooth, a procedure which is not infrequently indicated.

Fig. 15. The radiolucent area at the apex of the cuspid gives the tooth the appearance of being abscessed, but it is not. It responds positively to the electric test. The abscess arises from the lingual root of the first bicuspid, the crowned tooth.

Figs. 16 and 17 are different views of the same case. Both the lateral incisor and the first bicuspid are involved in a very large abscess. And, certainly, the cuspid has the radiographic appearance of being involved also—but it is

not. It responded (+) to the electric test. Subsequent history proved correctness of diagnosis.

It will probably not show in the halftone, but, in the negative, a radiolucent line (the usual line indicating the pericemental membrane) could be seen following the cuspid root. The presence of this line could not be considered proof of the vitality of the tooth, but it was contributory evidence of vitality. Not even the presence of both the radiolucent line, indicating the pericemental membrane, and the radiopaque line, indicating the lamina dura (i. e., the dense layer of bone lining tooth sockets) proves the pulp of the tooth vital and the tooth not abscessed. (See Fig. 11.)

Fig. 18 shows the mental foramen at the apex of the first bicuspid. This is a little farther forward than one ordinarily finds the foramen and so the

Fig. 16.

Fig. 17.

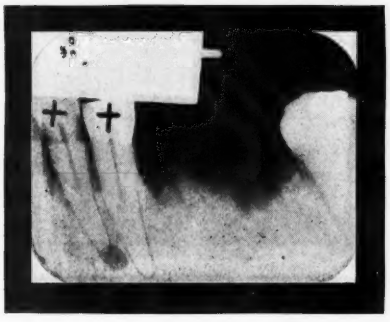


Fig. 18.

test is particularly needed to make sure that the pulp in the first bicuspid is vital.

Fig. 19. When in doubt, it is sometimes expedient to make an extra-oral radiograph to assist in differentiation between an abscess and the mental foramen. If a spot is seen at the apex of one of the bicuspid teeth and the mental foramen can be seen elsewhere, then the spot at the apex of the tooth must be an abscess—or a large cancellous spot in the bone. One can get a fair idea as to whether it is a large cancellous spot or not, by the general appearance of the bone, a considerable area of which can be seen in an extra-oral radiograph. In this illustration the mental foramen is at the apex of the second bicuspid.

Fig. 20. The abscess illustrated here is larger than an antrum. Obviously the first bicuspid is pulpless, for we see canal filling in the canals. The roots of the cuspid and second bicuspid seem to have their apices absorbed. These

teeth gave a negative (–) reaction to the electric test for pulp vitality. After extraction it could be seen that these root ends had been destroyed just as they appear to be in the radiograph. The crown was removed from the lateral incisor and the electric test applied. It was negative (–). This tooth also was involved in the abscess. The central incisor, which does not show in the

Fig. 19.

Fig. 20.

Fig. 21.

negative, also was involved as seen in another negative, not reproduced here.

The electric test is of extreme value in checking up such unusual findings as these.

Fig. 21. How many teeth are involved in the abscess illustrated here? Frankly I cannot tell. I am reasonably sure that the central incisor, with

the canal filling, is involved because I know it is pulpless and because its apex is about in the mesio-distal center of the diseased area. But are the two approximating teeth involved? That is the question. And, in the absence of electric test records, I cannot answer it.

Fig. 22. Symptoms those of semiacute dentoalveolar abscess with sinus discharging pus in apical region between central and lateral incisors. The radiograph shows bone destruction along the sides of the roots between the central and lateral incisors near the apices but without definitely involving the apices. Response to electric test a definite positive (+). Conclusion: One of those comparatively rare cases of "pyorrhea" where, instead of the pus discharging about the neck of the tooth it discharges like a dentoalveolar abscess through the external alveolar plate.

Fig. 22.

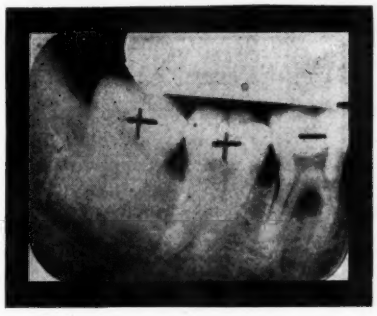


Fig. 23.

The treatment indicated for pyorrhea is vastly different from that indicated for a dentoalveolar abscess, hence the necessity of correct diagnosis. This case was treated in accord with the diagnosis given above and yielded to the treatment.

Fig. 23. There is a radiolucent spot at the bifurcation of the roots of the lower first molar. The tooth is negative (−) to the electric test. The tooth is abscessed, though there is no radiographic evidence of it at the apices of the roots. The dark area at the bifurcation is caused by a perforation of external alveolar plate, i. e., a hole in the external alveolar plate. This perforation of the external plate of bone on a level with the bifurcation of the roots is due to the thickness of the oblique ridges. If, my reader, you are inclined to incredulity, let me say I have a dry specimen closely analogous to Fig. 23.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Some Cases of Malocclusion Corrected by the Ribbon Arch. R. Tarasido. Boletin Dental, Buenos Aires, 1920, i, No. 11, p. 26.

Three different cases of anomalies, corresponding to the first, second, and third class of typical dental malocclusions, were selected by the author for the practical demonstration of the efficiency of this apparatus, its correct application, and the excellence of its mechanism, by means of which the desired action is exerted, without loss of energy, in the most suitable direction, without impairing the physiologic function of the tissue-cells. The apparatus is eminently useful for the majority of deviations of the teeth and malformations of the jaws, such as imperfect development, prognathism, and so forth. Special attention is invited to the fact that the success obtained in these cases was secured without resorting to extractions or mutilations, which have seemed unnecessary to the author in all cases so far treated by him with the ribbon arch system.

Maxillary Sinusitis of Traumatic Origin. A. Garcia. Revista Dental, 1920, xii, No. 9, p. 273.

The author's first observation concerned a boy of thirteen years who went to sleep in the barn near a pile of wheat and received a shower of grains in his face, where they penetrated into the mouth and nostrils. Most of them he got rid of by bending over, but two grains seemed to persist in the right nasal fossa and he tried in vain to dislodge them by various injudicious manipulations, including injection of water and introduction of a small stick. Next day a quack practitioner added insult to injury, by trying to extract the grains with toothed forceps, without the assistance of a frontal mirror or nasal speculum. Instead of the wheat, shreds of detached mucosa were brought out, followed by hemorrhage, which subsided after three days, and pain which failed to disappear entirely. The patient was not seen by the author until about half a year later, when he was suffering from frontal headache and profuse suppuration from the right nostril, the pus finally escaping from the mouth after some months of alternate aggravation and improvement. Examination of the affected nasal fossa showed it to be full of polyps bathed in

thick greenish pus, preventing inspection of the walls; the polyps protruded through the choanæ and were shown by posterior rhinoscopy to occupy the cavum; the right maxillary and frontal sinuses appeared dark on diaphanoscopy. Removal of fourteen polyps of ordinary size was followed by immediate improvement of the distressing symptoms and reestablishment of nasal respiration. The patient refused further operative treatment which was urgently recommended. When seen again thirteen months later, he had been suffering for about half a year from a return of the old disturbances in the form of severe persistent headache, frequent rise of temperature, complete obstruction of the nasal fossa and profuse purulent discharge. On inspection, the nasal fossa appeared again full of polyps, which were removed, with resection of the inferior turbinate and scraping of the mucosa. Eight days later, the maxillary sinus was opened by the buccal route and treated, following the customary technic; the antrum was found to be full of vegetations and pus. The patient made an excellent recovery and was free from all disturbances at the time of the report.

Another observation concerned a woman suffering from a not very profuse but persistent nasal suppuration of prolonged standing. She gave a history of much trouble with her molars and had been repeatedly under the treatment of a dentist who had filled several molars and extracted some others. After the first molar had been extracted on account of the severe toothache caused by it, the gums a few days later became tender and the gingivitis gradually progressed, so that the dentist found it necessary to extract several other teeth. The right upper gums healed, but the left remained congested and were painful precisely at the point where the first molar had been extracted, a small fistula could here be seen from which pus was easily made to exude even with the tongue. The patient when seen by the author had only the right canine and the second left molar tooth. Puncture of the maxillary sinus and irrigation with a solution of bichloride of mercury cured the nasal suppuration, and the fistula of the gums disappeared after extraction of the molar and removal of a small sequestrum which dated from the first extraction and was the cause of the sinus inflammation. Its immediate removal would have guarded not only against the sinusitis but also against the loss of all the upper teeth.

Treatment of Complicated Cleft Palate. J. B. Roberts. Pennsylvania Medical Journal, 1920, xxiv, No. 2, p. 64.

Early operative treatment of congenital clefts of the oronasal partition, within the first two months of life, is advocated by the author who points out that the osteoplastic restoration of the alveolar arch may be carried out with little hemorrhage and little shock, and without a long etherization. Division of the bone on one or both sides of the fissure is frequently required, so that the two sides of the cleft can be forced together and wired in proper relation to each other. This is advantageously accomplished during the first month of life. After the ends of the wire have been twisted, the lip may be pared and sutured, if the condition of the patient permits; otherwise, the harelip should

be given surgical correction about two weeks after the osteoplastic operation on the alveolus. The wire is left undisturbed in the maxilla for four to five months. The sutures of silkworm gut are taken out about ten to fourteen days after the reconstruction of the lip, on which no dressing is used. In bilateral clefts with protrusion of the intermaxilla, this bony segment has to be forced back into its proper site, but is never removed, being an important part of the oral architecture. It is frequently impossible to shove it into a proper relation with the lateral parts of the alveolus, unless a V-shaped piece of the vomer and cartilaginous nasal septum is cut out by the surgeon, which can sometimes be done as a submucous operation. A saw is sometimes used by the author to cut through the base of the projection, in order to obtain a nearly normal reconstruction of the incisor region of the alveolar arch. When the intermaxilla has been finally replaced, the edges of the vomer may or may not be sutured with chromicized gut. The two sides of the intermaxilla are wired to the abutting ends of the lateral portions of the alveolus. He does not freshen the ends before drawing them into contact or nearly into contact with each other.

In complicated oral fissures, it is usually wise to delay the uranoplasty proper until the age of eight or ten months, at which time the author undertakes the closure of the cleft in the bony palate (uranoplasty). The soft palate is closed, or not, at the same operation, according to the width of the fissure through the entire palate structures and the anticipated difficulties of suture without undue tension. His chief desire is to secure closure of the bony fissure, even if the cleft in the velum must be left for subsequent operation, in the child's second or third year. When partial closure only has been obtained in complicated cleft palates, successive attempts are to be made; the author usually waits five or six months between operations on the roof of the mouth, but makes every reasonable effort to close the whole gap for nostril, lip and alveolus to uvula, before the child is three or four years old. He prefers to use silkworm gut for the important stitches and introduces all at a fairly distant point from the margins of the cleft in both soft and hard parts of the palate. Tension on the sutures must be carefully guarded against, in order to prevent the separation of all or a part of the suture line.

Removal of Foreign Bodies from Maxillo-Facial Areas. J. D. Eby and W. Reed. The Journal of the National Dental Association, October, 1920, p. 847.

The authors emphasize the difficulties attending the removal of war projectiles or their fragments from the region of the jaw and face, especially in the case of healed wounds. Immediate removal of foreign bodies from fresh wounds is much simpler, as the open tract assists localization and the object can be more easily grasped and extracted, either through its path of entrance or by way of a shorter artificial tract. Injuries of important adjacent structures in the form of nerves, vessels and muscles, with their dangerous sequelæ, can only be avoided through absolute mastery of the entire regional

anatomy. The successful location of foreign bodies usually results from the combined efforts of a careful physical examination of the patient, the detection of its location by sensation or nerve phenomena, and by the use of the x-ray. There are three advantageous methods of x-ray examination: (a) Location by simple radiograms focused at cross measurements. (b) Location by stereoscopic radiograms. (c) Localization with the use of fluoroscopy. The final and accurate means of localization usually involve the employment of the fluoroscope by one of two satisfactory methods of procedure, the selection being governed largely by the equipment and surroundings as well as the gravity of the impending operation. In the majority of fresh contaminated wounds, with more or less superficially situated missiles, the field can be injected with a local anesthetic and the foreign body can be dissected out through an incision, while in constant view under the fluoroscope. The risk of infection through surgical manipulations under the fluoroscope is too serious to permit the employment of this method in healed wounds unless proper equipment is available, which is rarely the case. By placing the patient beneath the fluoroscope and using an indelible marker, a spot can be made on the surface immediately over the object with the head placed in an exact antero-posterior position, then by placing the head in an accurate lateral position, another spot can be made with an indelible marker and sufficient other locative points can be determined from the overlying anatomy, and the patient taken to the operating room where proper preparation is waiting. After anesthetizing, an instrument such as a long needle may be thrust in the correct line through the spots and their point of convergence will usually strike the object, and it can be very readily detected by tactile sensation. As a rule, every effort should be made to extract the missile intraorally by incising the mucosa and establishing a tract leading to the missile by means of blunt dissection. Infection can be controlled by proper postoperative treatment as follows: After the removal of the missile, which is usually grasped with a hemostat, the tract should be packed with a trailer of rubber tissue permitting irrigation for several days with normal saline, thus inducing healing from within outward. Favorable results were obtained by these means in the U. S. Army General Hospital, Washington, D. C.

The Roentgen Ray in the Diagnosis of Sinus Disease. S. B. Chase. Journal of Iowa State Medical Society, 1920, x, No. 12, p. 404.

In the x-ray examination of the sinuses, several positions of the patient and tube are used, depending upon which sinuses are suspected. The two positions most commonly used are the postero-anterior and the lateral, the latter of which is sometimes stereoscoped. By the postero-anterior position commonly used in routine examination it is possible to show the frontal and maxillary sinuses, the anterior and posterior ethmoidal cells on the same plate without obscuring the antrum outline by shadows of the petrous portion of the temporal bone. The lateral view, in which the patient is placed on his side, the central ray passing through the middle of his zygomatic arch, is taken mainly to ascertain the depth of the frontal sinus, sella, etc. The sinuses are not shown in detail in this position. The sphenoidal sinus is

the most difficult to get and the least satisfactory where the diagnosis of pathology is concerned. The author describes two customary positions for this sinus, besides several additional positions for the ethmoids, maxillary antrums, and frontals. It is noteworthy that prolonged soft rays are liable to cause alopecia, or dermatitis; while a hard penetrating ray tends to give lack of definition. If a fast plate is used with intensifying screens, a soft ray may be used over a short space of time with good definition. A soft ray may be used for a longer time with proper filters. Very good success was obtained at Fort Dodge, in moderately thick skulls, by using Eastman duplitized films with intensifying screens, and a soft ray from four to five seconds. The technic for each position should be as exact as possible, the current steady, with a transformer especially for the machine so that all pictures may be taken as uniformly as possible. A reasonable amount of care and skill should get good pictures. In the interpretation of the plate, the history, symptoms, and clinical finding should be taken into consideration. In certain conditions, the diagnosis of the existing disease may be made by the x-ray alone.

The Value of Skiagrams in Dentistry. T. H. Gibbs. The Dental Record, 1920, xi, No. 12. p. 711.

The author cautions against exaggerated and uncalled for employment of dental skiagraphy which he says is in danger of being grossly abused and will soon be discredited, unless saner views prevail. It is not necessary to get skiagrams of every tooth in every patient, or to take them several times over in the course of treatment, excepting in rare cases. At the same time the dentist should never hesitate to invoke the aid of the skiagram in cases where it would be likely to give him useful information that he could not otherwise obtain, and he should remember that even negative evidence is often of great value. For instance in everyday practice skiagrams should be obtained in a very large proportion of orthodontic cases; in delayed eruption of the permanent teeth; in cases of unusual swellings; in many, but by no means all cases of dentoalveolar abscess; often when a tooth has been fractured; the most emphatically in all cases of obscure pain and neuralgia. Skiagrams are also valuable in investigating specimens and tumors which it is desired to keep intact.

With special reference to the reproduction of bone in cured cases of apical abscess, the author points out the difficulty of deciding upon the basis of the skiagraphic findings whether a rarefied apical area is due to an active abscess or to one that has been cured. This point can probably be settled by getting a skiagram of the part before beginning the treatment of a tooth with a dead pulp or abscess. The pulp canal and abscess can then be treated, and if the treatment seems to have been a success, the tooth may be filled. A year afterwards at latest the part should be skiagraphed again from exactly the same position and the two skiagrams compared. If there is distinct evidence of new bone formation, the abscess may be considered as cured and the tooth as no longer a menace to the patient.

The Practical Significance of Dental Radiography. O. Weski. Zahnaerztliche Rundschau, July 27, 1920, xxix, 39.

Dental radiography seems primarily indicated in the diagnosis of fractured roots, broken drills, etc, retained teeth and especially granulomata. Next to the location of projectile bullets there is nothing so important; nothing moreover is more simple than to x-ray the teeth. Let us suppose that three patients with different affections consult the dentist for toothache. One has deep caries and pulpitis, but the examination reveals further cavities; another presents, along with an aching tooth, necrosis of the pulp; while a third has a fistula above a molar. In the first case the pulp is cauterized and this and the other cavities filled. In the second case the pulp cavity must be disinfected, etc. In the third patient the x-ray must be used, and the damage corrected. But the public is entitled to more benefit from radiography and it is impossible to care for the teeth of a subject year in and out without systematic radiography. Much about the teeth is not apparent to the dentist's vision. The dentist in the interest of prophylaxis must x-ray the teeth in the detection of caries. Cases are cited where the rays showed the presence of cavities which escaped observation by the usual means. In persistent neuralgias this is liable to occur. Approximal surfaces in closely apposed teeth, especially in incipient caries, are often beyond ordinary resources, but systematic raying will bring these hidden foci to light. Next to early caries the status of the interdental septum may often be appreciated by the rays in connection with pyorrhea and other conditions. A third field is the detection of periapical foci, while x-ray control is useful at times when treating roots.

Some Cases of Hare-lip and Palatine Fissure. Vignard. Revue Belge de Stomatologie, 1920, xviii, No. 5, p. 242.

In the course of eight months preceding this report, the author had occasion to operate upon a fairly large number of cases of hare-lip and clefts of the alveolar border of the palatine vault or the velum of the palate. The simplest cases are those in which there is only a solution of continuity of the upper lip. The operation for this deformity is not serious and can be performed on very young children, as soon as two to three weeks after birth. The restoration here is usually easy and satisfactory, but becomes rather more difficult and complicated when the cleft extends into the interior of the nostril and involves the cheek. Although the repair of the nostril is associated with a greater loss of blood and time than simple repair of the lip, it can be carried out in children between four and six months of age. The author has successfully performed it in a little girl one month of age, but it is preferable to operate a few months later. The same remark applies to cases of double hare-lip, especially when complete. These cases may moreover be complicated by a cleft involving only the alveolar border or extending backwards on the bony roof and the velum of the palate, which are divided in their entire length. Sometimes, there exists merely a gap, an actual loss of substance, so that one can look through the mouth into the nasal fossæ, where the free border

of the vomer in certain cases partly closes the gap. The separation of the alveolar border may be limited to a simple gap, but in other cases there is a real loss of substance, further aggravated by the failure of the two borders of this gap to correspond exactly and by their position in different planes, one lying anteriorly to the other, with the result that the repair of the upper lip itself becomes more difficult. When there is too much disparity between the two borders of the gap, the junction must be accomplished by mobilizing the incisor bone and replacing it in a suitable position. This bony intervention requires a certain power of resistance and strength on the part of the child, who must have reached the end of the first year before it is attempted. The lip should not be touched before this time, so as not to add to the difficulty of the operation. This mobilization of the incisor tubercle is still more indicated and should be performed at the same age, when as is often the case in double complete and complicated hare-lip, the incisor tubercle is found lying by itself in the middle of the gap. It should never be excised, but after a wedge-shape resection of the septum, the bone should be replaced and sutured if possible to the two borders of the gap.

The repair of the palatine vault constitutes a longer, bloodier, more difficult, and more serious intervention, which should be postponed until the age of at least four, sometimes five or six years. When performed in two sessions, at a week's interval, according to the author's technic, each operation requiring not more than twelve minutes, plastic work upon the palate does not involve much traumatism and may probably be done earlier, at the age of about three or four years, which is advantageous from the viewpoint of ulterior phonetic education of these children.

Cleft Palate Extraordinary. T. W. Brophy. Surgery, Gynecology, and Obstetrics, 1921, xxxii, No. 2, p. 182.

The author's remarkable observation concerned a case showing a cleft of the palate in the median line, with the premaxillary bones separated at the central suture and the palate cleft throughout the entire length. The patient was a girl fourteen months of age, whose lip also was divided in the median line; a central incisor tooth occupied each premaxillary bone. The lower teeth did not occlude with the upper teeth, but came in contact with the soft parts covering the palatal surfaces. Treatment consisted in moving the bones together by passing wire sutures through them, keeping the sutures above the hard palate. A double suture was carried through the bones in three different places. Heavy lead plates, No. 13 American gauge, were perforated in three places and double wires were carried through these holes and twisted upon the plates, a little force being applied so that the wires might be well tightened. Two anterior and two posterior wires were carried around anteriorly to the premaxillary bones and tightened. Ten days later, the slack was drawn out and the wires tightened under anesthesia, this tightening process being repeated at intervals of about ten days until at the end of the third month the anterior parts of the cleft (the separated premaxillary bones) were in contact and the edges posteriorly were nearly so. After the parts were approximated, all the wires were removed and new ones placed in the anterior

part through the openings occupied by the former wires. The surfaces in contact were freshened, the compact bone removed, and the cancellated bone exposed. The soft parts were sutured together, and the new wires were so tightened that the freshened bones were brought into immediate contact. The soft parts were closed by horsehair sutures. After six weeks, the lip was closed. One month after the closure of the lip, the hard palate along the edges of the cleft was denuded of the mucoperiosteum which was united, thus completing the operation. Since his favorable experience with this child, the author has moved together the bones in a patient of four years.

Dental Hygiene in Schools. F. Gonzalez Camargo. Revista Dental, 1920, xiii, No. 12, p. 356.

Buccal hygiene is the essential basis of preventive medicine in general, which without its assistance cannot accomplish satisfactory results. Mastication being the most important step in the digestive process, nutrition will be impaired if the formation of the alimentary bolus is not correct, and such a formation will be impossible if the tiers of teeth do not properly chew the food and if the salivary glands do not impregnate it with their juices. In view of the fact that at school-age the organism requires a larger amount of nutrient constituents, this being the time of greatest physical development as well as increased mental activity, the hygiene of the mouth is most necessary at this age. Physical impoverishment delays development and renders the organism more susceptible to the action of pathogenic agents. Carious teeth, ulcerated gums, suppurating fistulas, etc., not only prevent proper mastication, but constitute infectious foci, whose secretions when ingested are dangerous to the organism, giving rise to intoxications which often prove fatal. The general malnutrition of the system caused by the deficient mastication impairs the mentality up to the extreme degree of rendering the child unfit for the accomplishment of his school-work. Dental hygiene of school children should not be limited to prophylaxis, however, but should be extended to reconstructive operative dentistry. The state has the duty of watching over the health of the children who visit its schools, and must therefore impose dental hygiene in schools as an obligatory measure, providing for the primary instruction of inspecting dentists, and establishing dental clinics where the children can be cared for by experienced specialists. The National Odontological Association should duly contribute its knowledge, collaborate in the patriotic duty of improving the dental hygiene of school children, and assist the state in the organization of dental services for the primary schools of the country.

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EDITORIALS

Some Thoughts Relative to the Treatment of Posterior Mandibular Occlusion

IN THE November, 1920, issue of the International Journal of Orthodontia and Oral Surgery is an article by Dr. Calvin S. Case entitled "Principles of Retention in Orthodontia." This is a paper which was read before the American Society of Orthodontists in April, 1920, and deals with the retention of certain types of malocclusion in which it is necessary to change the anteroposterior relation of the teeth of one arch to occlude with the other. The paper is of particular importance because Dr. Case recites some of the difficulties which he has experienced in attempting to obtain normal arch relations in these cases and particularly in those cases which are characterized by a posterior relation of the mandibular to the maxillary teeth. Some of the results have been so unsatisfactory to him that he is inclined to look upon them as

failures. There is no question in our mind but that any one who has practiced orthodontia a number of years has encountered similar cases with equally unsatisfactory results. In other words, there is a small percentage of posterior occlusion of the mandibular teeth which does not respond to treatment that is successful in the other cases. The reason for the failure of these cases to respond to the usual types of treatment has not been exactly agreed upon, and the lack of satisfactory results may be the result of several things in each case. Dr. Case is inclined to attribute the cause of failure to inherited conditions, with which reasoning we cannot agree, but the fact remains that we still have these cases with us and some plan must be followed that will insure greater success than has been obtained sometimes in the past.

That present plans of treatment are not entirely satisfactory is proved by the discussion provoked by the paper in question. It is to be regretted that the men who were to discuss Dr. Case's paper did not discuss the principles of retention mentioned, but considered certain points which had no direct bearing on the principles involved. The important point of retention brought out in Dr. Case's paper, as it appeared to us, was that some means must be employed that will insure an actual forward movement of the anterior mandibular teeth and permanently retain them. This has not been accomplished by some of the plans of treatment outlined in the past.

We shall review some of the different plans advocated for the treatment of posterior occlusion of the mandibular teeth. In these cases, in order for normal relations to be established, it is necessary to bring all of the mandibular teeth forward the width of one premolar. Associated with the above named conditions is a lack of development of the mandible and a receding chin. As a result of these symptoms different plans of treatment have been suggested. One of these is the moving forward of the mandible with a view to changing the temporomandibular articulation. This is one of the oldest plans advocated and one which has given the smallest degree of success. The more successful plan is to move the mandibular teeth forward and leave the condyle in the anatomic position. This plan tends to produce a development of the body of the mandible and a development of the chin. If the forward movement of the mandibular teeth can be accomplished without the forward movement of the mandible, we will establish a result which will be highly satisfactory. However, the difficulty has been that in a certain number of cases, for various reasons, we do not obtain the forward movement of the mandibular teeth that is desired. In some cases, after the maxillary arch has been widened and during the course of treatment, the patient has developed the habit of protruding the mandible until the mandibular teeth assume a normal anteroposterior relation with the maxillary teeth. Some men contend that if this habitual protrusion of the mandible is continued long enough it will become a fixed position, but little has been presented to establish that fact and the large number of relapsed arches tend to disapprove it. We also find that these patients who have allowed the mandible to protrude as a result of the forward pull of the intermaxillary rubbers only hold the mandible in that position during rest, and masticate in the old posterior position. Some operators, as a result of the false position of the mandible, assume that the maloc-

clusion has been corrected, retain the case with the mandible in this false position, and when the retaining appliances are removed, the mandibular teeth relapse to their old position and the case is classed as a failure. In truth the case is a failure, not because of the limitation of the science of orthodontia, but because the orthodontist has been misled, and instead of moving the mandibular teeth forward, the patient has allowed the mandible to protrude and therefore the malocclusion was never corrected. Now, what was demanded in those cases was the forward movement of the mandibular arch with the condyle remaining in the anatomic position. In some patients it is practically impossible to get them to hold the mandible in the normal anatomic relation when the intermaxillary rubbers are being worn. That the necessity for the lengthening of the mandible has been recognized by many is proved by the fact that with Dr. Case's plan of retention in these posterior occlusions, the anterior teeth are carried forward, which actually lengthens the mandible sufficiently for the insertion of an extra premolar. His plan of retention indicates that the mandible should be lengthened.

We are of the opinion that with certain cases that are treated with a view to using Dr. Case's plan of retention more positive results will be obtained than with any other plan of retention up to the present time. The thing that appeals to us the most is, not the plan of retention, but certain phases of the treatment which carry the anterior teeth forward and thereby lengthen the mandible. It has been proved by the experience of many that in those patients who allow the intermaxillary rubbers to pull the mandible forward we do not get the increase in length of the mandible that we want. Now, if the mandibular anterior teeth are moved forward as Dr. Case suggests, there is bound to be an increase in the length of the mandible. Therefore, in following this treatment we have positively accomplished something that we were never sure of in some troublesome cases.

After the anterior teeth have been moved forward, which movement has not disturbed the anatomic position of the condyle, we then can use some means of retaining the mandibular anterior teeth in their normal position, and these teeth can also be used as a guide in preventing the patient from protruding the mandible. Furthermore, while the mandibular anterior teeth are being moved anteriorly, the molars in the mandibular arch remain in their positions of malocclusion and serve as guides in indicating that the patient is not shifting the mandible. Of course, it is to be assumed that while the anterior mandibular teeth are being moved forward, the maxillary arch is being widened in the canine and premolar regions and the incisors retracted so the mandibular anterior teeth will occlude with the maxillary incisors, in their normal position. As the case now stands, after the above treatment, we have the maxillary arch widened in the premolar and canine regions and the incisors retracted to make a normal arch. The condyle remains in the anatomic position it occupied before treatment as the molars remain in the original posterior position. The mandibular anterior teeth, which includes the canines and premolars, have been brought anteriorly and a space created for an extra premolar. In these troublesome cases we retain the maxillary teeth so as to keep the normal shape of the arch and retain the mandibular teeth

which have been moved forward so they cannot retract. From now on our efforts should be to move the posterior mandibular teeth forward and close the space we have created; the same as the plan used in moving the posterior teeth forward to close the space of an extracted tooth. With the anterior mandibular teeth retained so they cannot drop posteriorly, the maxillary incisors will act as a means of preventing the patient from protruding the mandible. By moving the mandibular teeth forward according to the above method, we are positive that the mandibular arch has been lengthened without the condyle being moved forward. As the teeth only have been moved forward, the mandible will not assume a distal position for it has not been changed. With the usual plans employed, the orthodontist is never sure he is not being deceived by the patient's protruding the mandible and making a better appearance than conditions justify.

We have seen patients who would allow the mandible to protrude as soon as the intermaxillary rubbers were placed in position. The intermaxillary rubbers do not therefore move the teeth, and the body of the mandible is not lengthened. However, by following the plan of moving the mandibular teeth forward in groups, (which is the only plan that can be followed in that class of patients if we confine ourselves to intraoral appliances), we get a lengthening of the mandible and a certainty of results that has not been obtained by any plan except that suggested by Dr. Case in his paper on "Principles of Retention."

NOTE: Since writing the above, we have learned that Dr. Jos. E. Johnson, of Louisville, has treated posterior occlusions by a similar plan.

ORTHODONTIC NEWS AND NOTES

The editors desire to make this department a permanent feature of the Journal, but in order to do so must have the full support of the orthodontic profession throughout the country. We would deem it a great favor if our subscribers and readers would send in such announcements as might be of interest to the profession.

The Eastern Association of Graduates of the Angle School of Orthodontia

The Twelfth Annual Meeting of the Eastern Association of Graduates of the Angle School of Orthodontia will be held on Saturday, May 28, 1921, at the Academy of Medicine, 17 West 43rd Street, New York City. The following program has been arranged:

1:30 P.M. President's Address, Dr. Earl W. Swinehart, Baltimore, Md.

2:00 P.M. The Saliva; Its Bearing on Mouth Conditions in General and Malocclusion of the Teeth in Particular, Dr. Henry C. Ferris, New York City.

2:45 P.M. Position in Utero as revealed by the X-ray and Its Probable Bearing on Malocclusion of the Teeth, Dr. B. W. Weinberger, New York City.

3:15 P.M. Limitations of the Lingual Arch, Dr. Robert H. W. Strang, Bridgeport, Conn.

4:00 P.M. The Modern Trend in Orthodontia, Dr. Frank A. Gough, New York City.

4:30 P.M. Business Meeting and Election of Officers.
Nominations for Officers 1921-1922:
President, Dr. C. A. Hawley,
Vice-President, Dr. Ira B. Stilson,
Secretary, Dr. E. Santley Butler,
Treasurer, Dr. Walter S. Watson.

6:30 P.M. Dinner. An informal dinner will be served at Gibson's (Healy's) Grill, 42nd Street and Madison Avenue, New York City. Please inform Dr. E. Santley Butler, 576 Fifth Avenue, N. Y. C., of your intention to be present.

Alumni Association of the International School of Orthodontia

There will be a meeting of the Alumni Association of the International School of Orthodontia at Hotel Baltimore, Kansas City, Mo., July 14 and 15, immediately following the annual session of that school.

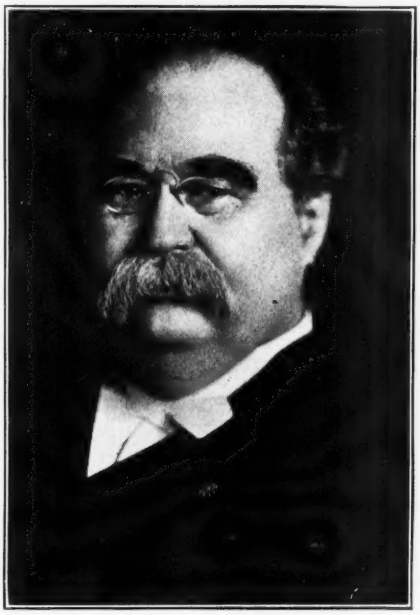
A cordial invitation is extended to all dentists who are interested in Orthodontia to meet with us. F. O. Gorman, D.D.S., President. Sidney S. Block, D.D.S., Secretary.

OBITUARY

George Alexander Bowman, D.D.S.

By Burton Lee Thorpe

George Alexander Bowman, son of Joseph and Asenath Bowman, was born at Barnard, Vt., June 6, 1839. His early boyhood was spent on his father's farm. He attended the common school in the native village, and also had an academic course at Royalton and Newbury, Vt. Dr. N. W. Gilbert, an itinerant dentist visited his father's home; his exhibition of a case of fine dental instruments and some skillful dental operations, in which young Bowman was interested, was the incentive that led him into dentistry. He entered the office of Dr. Gilbert of Lowell, Mass., October, 1857. A year's tutelage with him and Dr. H. N. Roberts of Ludlow, Vt., was deemed sufficient to enable young Bowman to open an office at Canton St., Lawrence County, New York, October 8, 1858, where in company with his brother, the late Dr. J. A. Bowman of Minneapolis, he practiced until September 20, 1862, when he came West, locating at St. Anthony's Falls, Minn., (now East Minneapolis). Here he stayed a year and a half. In May, 1865, he opened an office in Milwaukee. This he sold in October, and came to St. Louis, arriving November 9, 1865, first becoming associated with Isaiah Forbes, with whom he remained four years. Here he practiced until 1918 when he retired. He assisted in organizing the Missouri Dental College, chartered September 16, 1866, in which he was the first demonstrator of prosthetic dentistry, and for years a member of the Board of Trustees, and of the Clinical Staff. From this institution he received the D.D.S. degree February 22, 1867, at the first commencement exercises. He and Dr. A. W. French of Springfield, Ill., were the only members of the class, and the oldest graduates of the school. He was President of the Missouri Dental College Alumni Association in 1891. Dr. Bowman joined the Missouri State Dental Association June 4, 1867; was its Secretary 1870-1-2, Vice-President 1875 and President 1876. He was President of the St. Louis Dental Society in 1873. He was an honorary member of the Illinois and Iowa State Dental Associations and President of the St. Louis Society of Dental Science, 1908. If Dr. Bowman was anything he was both an optimist and enthusiast. Always ready to learn from



George Alexander Bowman, D.D.S.

the humblest member of the profession and equally ready to instruct. He was always experimenting with the new things in dentistry. Of an ingenious turn, Dr. Bowman invented a number of useful instruments, among them a gum retractor, which preceded the present rubber dam clamp. This was put on the market together with an improved clamp forceps, known as the "Bowman-Allen forceps," as well as a mouth mirror and cheek retractor. He was the first to use gutta percha root canal points. With an exceptional skill as an operator, he has done much to ornament and enhance his profession. His operations were all of the highest order of excellence.

He was married March 17, 1864, to Miss Jennie E. Homer of New York. To them were born George Homer, Jennie Elizabeth, Grace Adelle, Paul Homer, Ariadne Josephine, Florence Hope and Birdie Belle McKellops, a practicing dentist in St. Louis.

In politics Dr. Bowman was a Republican. He had no church affiliations, believing in "the fatherhood of God and the brotherhood of man" in the true sense of the word. In secret societies Dr. Bowman had been a "jiner." He was a Knight Templar of the Masons, a member of the I. O. O. F., Knights of Pythias, Royal Arcanum and Legion of Honor, in all of which he had filled the highest offices, and been prominent in the ritualist and dramatic work.

Possessing a fine tenor voice, he sang for twelve years in St. Louis church choirs, singing many times the tenor part of the Messiah, also took a prominent part in amateur operas, oratorios, etc. He was a member at one time of the old Philharmonic Society and of the Oratorio Society as well as of the St. Louis Club and the St. Louis Jockey Club.

The St. Louis Society of Dental Science of which Dr. Bowman was President, 1908, in recognition of his long and useful career and his contributions to dental surgery, gave a dinner in his honor on his golden jubilee, October 8. The writer presented, on behalf of the Society, a beautiful loving cup.

Dr. Bowman's death on April 2, 1921, came peacefully, like a benediction in the passing of his lovable spirit.